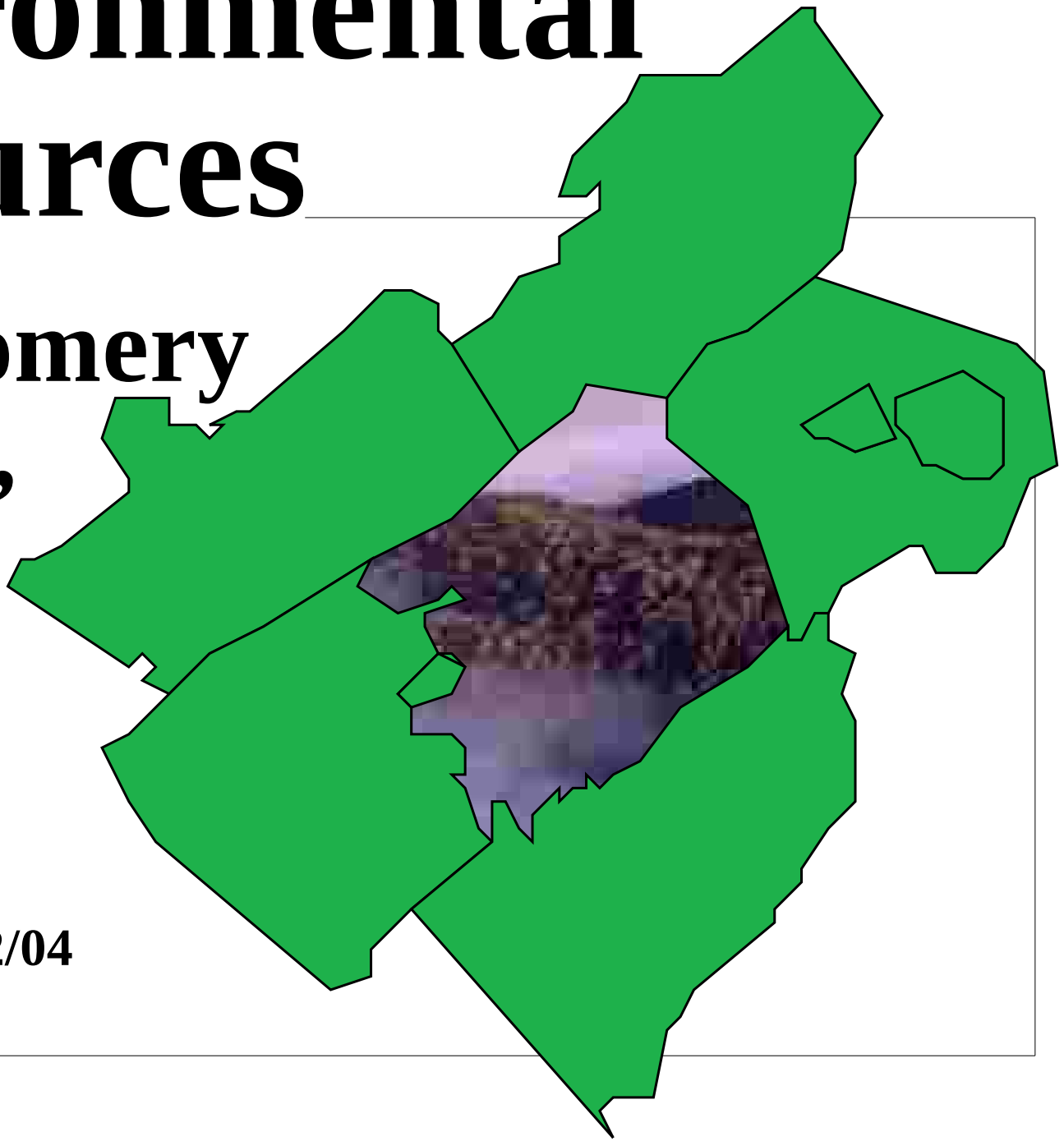
Environmental Resources

Montgomery County, 2025



Adopted: 10/12/04

Environmental Resources: Executive Summary

In 1947, Gifford Pinchot, wrote that "conservation means the greatest good to the greatest number for the longest time...[and] demands the application of common sense to the common problems for the common good." The natural resources of Montgomery County (including open space, agriculture, forests, water, karst, flora, wildlife, and mineral resources) are vital to the county's quality of life and provide substantial economic and recreational opportunities for the citizens of the county. By considering the natural resources in Montgomery County as a sustainable asset, an asset which will continue to contribute to the quality of life of generations to come, the County can encourage stewardship through the use of Best Management Practices, increased interjurisdictional cooperation, and common sense in natural resource conservation, preservation, and management.

Photos by Robert Parker

The environmental resources chapter focuses on seven key areas of interest:

- Resource Stewardship, including open space, water quality, air quality, species and habitat protection and environmental planning through the implementation of a geographic information system (GIS).
- Agriculture, Open Spaces, and Natural Resources
- Streams, Rivers, and Surface Waters
- Floodplains, including hazard mitigation
- Groundwater Resources
- Karst
- Stormwater and Erosion Control

Environmental Resources: Introduction

COMMUNITY SURVEY RESULTS

Participants were asked to rank five specific issues: agricultural preservation, environmental quality, old or failing septic systems, open space preservation, and protection of surface and groundwater. Of the five issues, protection of surface and groundwater had the highest score (4.33) and generated the greatest number of comments. Participants, overwhelmingly, rated the protection of ground and surface water as either “important” (19%) or “very important” (67%). Only 4% felt that protection of surface and groundwater was either “minimally important” (2%) or “not important” (2%). In examining response to the “protection of surface and groundwater” issue, the survey produced the following results:

- 69% of homeowners ranked the issue as "very important” while only 55 % of renters gave it the same ranking;
- 83% of those living in modular residences, 69% of those living in stickbuilt residences, 53% of those living in single-wides, and 50% of those living in double-wides ranked the issue as “very important;”
- 69% of those with children and 65% of those in households with no children ranked the issue as “very important,” and
- 68% of those living in the unincorporated areas of the county and 66% of town residents ranked the issue as “very important.”

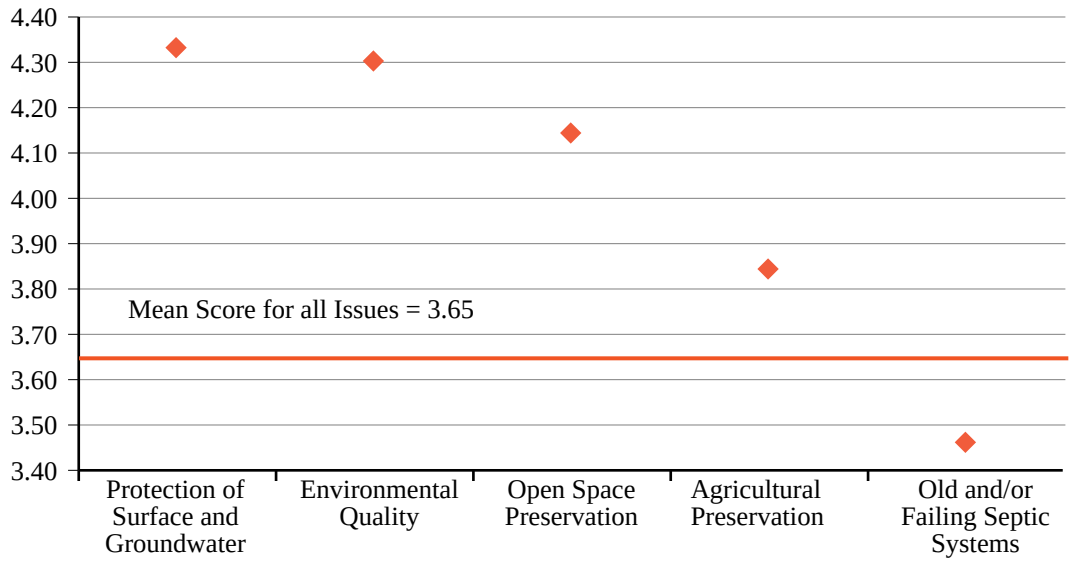
Interestingly enough, women were more likely to rate the protection of surface and ground water as “very important” (61% to 69%).

The result is, perhaps, not surprising given that the Community Survey followed closely on the heels of one of the worst droughts in the County’s history. With low water levels in the New, Little, and Roanoke Rivers, dry wells, and dusty yards fresh in participants minds, water-related concerns dominated many of the comments and the discussions in the community meetings. While most of the written comments were short and direct, demanding that the County pay attention to water quantity and quality, others drew the connection between water quality, environmental protection, and land use. One participant wrote that “...we need to protect ground water and limit residential expansion.” Others recommended that the County “reduce water pollution by using organic methods where possible for county parks and landscaping, ... use environmentally sound agricultural practices;” “require buffer zones on creeks and streams,” and “encourage riparian vegetation.” A number of participants suggested that the County take a coordinated, watershed approach to water resources, including: developing a “ watershed plan and implement [it] on whole watershed basis,” “coordinate watershed management and planning,” “develop a karst terrain ordinance and mapping program to protect groundwater,” and implement better "floodplain management.”

Environmental quality ranked a close second, among participants, with a score of 4.30, with 84% ranking it as either “important” (18%) or “very important” (66%). As with “protection of ground and surface water,” the issue produced

Photo by Robert Parker

Environmental Resource Issues: Community Survey Mean Results, 2003



	Mean Score
Protection of Surface and Groundwater	4.33
Environmental Quality	4.30
Open Space Preservation	4.14
Agricultural Preservation	3.84
Old and/or Failing Septic Systems	3.46

Note: Forty-one issues were included in the "rate this issue in terms of importance" portion of the community survey. A mean score was calculated for each of the 41 issues, as well as for the total of all issues. Issues with scores higher than 3.65 (the mean for all issues) indicate that the majority of respondents rated the issue greater importance; a score lower than 3.65 indicates that the majority of respondents rated the issue of less importance than the on average. The scale for the survey was: 0=no response; 1= not important; 2=minimally important; 3=moderately important; 4=important; and 5=very important. Source: 2003 Community Survey, Montgomery County, Virginia.

some similar subgroup results, although there were some differences between significant groups. Participants aligned with education (70%), government (67%), and religious (68%) organizations were more likely to rank "environmental quality" as "very important," than were participants from civic (59%), community (57%), and commercial/realty (53%) organizations. There were also differences in how participants in different age brackets ranked the issue of "environmental quality:" participants between 18 and 24 (57%) and over 65 (55%) were less likely to rank the issue as "very important" than were those ages 25-34 (62%), 35-49 (71%), and 50-65 (72%).

Participant comments, concerning "environmental quality" centered on four main issues: 1) the need for increased and effective environmental monitoring, especially of air and water quality; 2) the need for a more proactive approach to resource management in the County; 3) increased public education and awareness of environmental issues and best practices, especially in the agricultural community; and 4) the need to pay closer attention to and have greater awareness of the impact of industrial, commercial, and educational institutions on the environment. Participants advocated attracting clean or green industries, working with local companies and educational institutions to clean up environmentally unsound practices, and working with governmental agencies to enforce existing ordinances.

Participants comments, however, were not limited to these four issues. Many of the participants noted the need for increased inter-jurisdictional cooperation, especially in terms of water quality and waste management; the need for better agricultural and logging practices; the need for more stringent environmental assessments before approving development; and the need to increase environmental education in the public schools and among organizations in the County.

Open space preservation ranked third among the environmental resource issues (mean score

Photo by Bill Edmonds

of 4.14 and median score of 5.0), with 79% of participants rating open space preservation as either important (22%) or very important (57%). As described in the community facilitators glossary, open space preservation is a catchall category that refers to "the preservation of open space features and viewsheds, including ridgelines, agricultural and forestal areas, natural areas, wetlands and open water, and wildlife habitats."

Citizen comments covered a wide range of open space issues, including the preservation of natural habitats, development of greenways, the use of zoning to "maintain open space and [a] high level of environmental preservation," the creation of nature preserves, the promotion of development patterns which encourage open space preservation, the development of conservation easement programs and land trusts, and the design and implementation of effective open space planning.

As with the other environmental issues, participants saw proactive approaches and interjurisdictional cooperation as central to the preservation of open space. One participant suggested that the County "develop a plan to preserve open space that used county ordinances, the land trust, and county monies," Others suggested working with "surrounding localities to protect wood areas and greenspaces that cross county boundaries" and "adopt [an] open space plan into the comp plan that identifies natural and cultural resources worthy of protection." Still others suggested specific programs to address open space preservation issues, including: "institute a greenway park program similar to Roanoke Valley communities;" and "designate special protected natural areas and wildlife corridors to provide habitat for native plants and animals [by cooperating] with the Virginia Birding and Wildlife Trails [program] to develop tourism."

Agricultural preservation, although included in the description for open space preservation, was treated as a separate subject because the issue went beyond the preservation of natural resources. As defined in the Community Facilitators Handbook glossary, agricultural preservation includes not only the preservation

Photo by Bill Edmonds

Photo by Bill Edmonds

of farms and other agricultural lands, but also recognizes agriculture as a threatened industry in Montgomery County (as well as most rural jurisdictions in Virginia). In this sense, agricultural preservation is an environmental, planning, and economic issue.

Agricultural preservation had a mean score of 3.84, with 69% of participants rating it as either important (29%) or very important (40%). Support for agricultural preservation varied significantly by organizational type, previous participation, and age. Of the organizational types that participated in the community facilitator's initiative, only 8% of commercial or industrial organizations rated agricultural preservation as "very important," while 53% of participants from religious organizations, 41% from civic and community organizations, and 39% from educational organizations gave it the same ranking. Those who had previously participated in a planning workshop were more likely to rate agricultural preservation as "very important" (50%) than were new participants (39%). Support for agricultural preservation increased with age, with the highest level of support coming from participants ages 50-65 (45% rated it as "very important"), results which reflect similar trends on other environmental issues.

A number of participants noted the need to preserve the family farm, preserve local farming

Photo by Bill Edmonds

in order to protect the local food supply, and protect farmland from subdivisions and developers. One common theme running through participants comments was the need to maintain government support of local agriculture through use-value taxation, maintaining the "safety net (tax reduction)" for agricultural areas (family farms), and by "promoting markets for our locally produced farm goods." Participants also noted the need to expand the terms of the debate to include forestal lands, urging the County to "not lock up forest land for parks but maintain the forest land base as productive forest to provide continued economic benefits." Again, as with other environmental issues, participants suggested using existing and expanded zoning laws, other ordinances, tax incentives, and other support programs to help maintain the quality and quantity of local agricultural and forestry lands.

The last issue addressing environmental resources was concern for old and/or failing septic systems. While the issue did not garner as much support as other issues, with a mean score of 3.43, 57% of participants felt the issue was either "important" or "very important." Interestingly enough, concern over old and/or failing septic systems was higher among Blacksburg residents (62%) than among County (53%) or Christiansburg (53%) residents. Among participants' chief concerns was the need for heightened testing and monitoring, increased emphasis on alternative systems, and a concern over the impact of septic systems on the groundwater supply, especially in areas with karst terrain. As one participant observed, "there are too many septic systems for the geology."

Participants comments were not, however, limited to the five environmental issues included in the "rate this issue" portion of the survey. Participants expressed concerns over the need for local and government support for conservation easements, the purchase or transfer of development rights, and other landowner agreements; increased awareness of agricultural runoff and non-point source pollution; strengthening of local erosion and sediment control laws and ordinances governing trash, junk cars, property maintenance, and litter; and limiting the impact of light pollution in rural areas. As one participant wrote, "the county is now evolving into not only the dumping grounds for dead automobiles but dead mobile homes are starting to litter the county landscape." Another wrote, "I do not want to leave my children/grandchildren [with] the filthy sprawl I left in North[ern] Virginia." Indeed, not wanting to become Northern Virginia, maintaining the rural qualities and quality of life, and preserving the natural environment were fairly common themes, especially in participants' futures statements.

CURRENT AND HISTORICAL TRENDS AND CONDITIONS

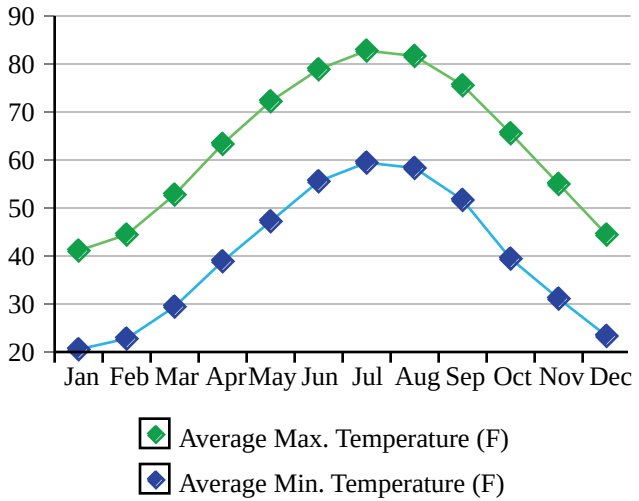
Physical Description

Covering 388 square miles, Montgomery County is characterized by three distinct geographies: the Blue Ridge Mountains in the southeastern portion of the county, the initial slopes of the Allegheny Mountains along the northern portion, and the Christiansburg Plateau, in the southern, central, and western portions, separating the two ranges. In addition, Montgomery County is split by the Continental Divide, which defines the eastern edge of the Christiansburg Plateau and neatly cuts Brush Mountain and Gap Mountains, in the northern portion of the county, into three

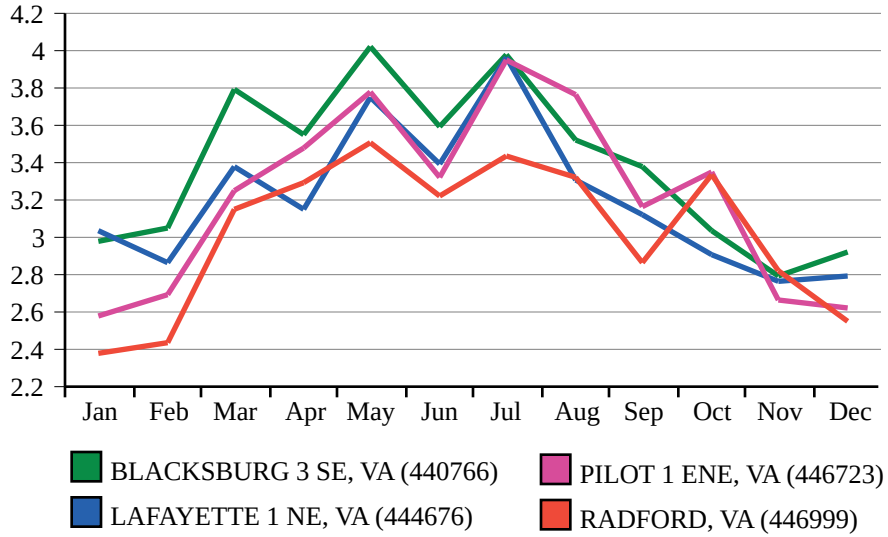
Photo by Bill Edmonds

Montgomery County: Average Temperature and Precipitation, 1951-2003

Average Maximum & Minimum Temperatures: Blacksburg 3 SE, VA (440766), 1951-2003



Average Annual Precipitation, by Month, 1951-2003



Average Max. Temperature (F)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
BLACKSBURG 3 SE, VA (440766)	40.9	44.7	52.9	63.6	72.1	78.8	82.7	81.6	75.7	65.5	54.9	44.2	63.1
Average Min. Temperature (F)													
BLACKSBURG 3 SE, VA (440766)	20.4	22.9	29.7	38.7	47.4	55.3	59.7	58.5	51.4	39.3	31.1	23.6	39.8
Average Total Precipitation (in.)													
BLACKSBURG 3 SE, VA (440766)	2.97	3.05	3.78	3.54	4.02	3.58	3.97	3.52	3.37	3.03	2.79	2.91	40.52
LAFAYETTE 1 NE, VA (444676)	3.03	2.86	3.37	3.14	3.74	3.38	3.96	3.3	3.11	2.9	2.76	2.79	38.32
PILOT 1 ENE, VA (446723)	2.57	2.68	3.25	3.47	3.77	3.32	3.94	3.76	3.16	3.34	2.66	2.61	38.54
RADFORD, VA (446999)	2.37	2.43	3.15	3.29	3.5	3.22	3.43	3.32	2.86	3.33	2.81	2.54	36.28
Average Total SnowFall (in.)													
BLACKSBURG 3 SE, VA (440766)	7.1	6.1	4.3	0.7	0	0	0	0	0	0	1.1	3.8	23.1
LAFAYETTE 1 NE, VA (444676)	6.5	5.4	3	0.4	0	0	0	0	0	0	0.8	3.6	19.6
PILOT 1 ENE, VA (446723)	6.2	4.3	2.9	0.6	0	0	0	0	0	0.1	1.3	3.3	18.8
RADFORD, VA (446999)	0.3	0	1.3	0.2	0	0	0	0	0	0	0.3	0	2.1

Source: Southeast Regional Climate Center, 2004 **Note:** Temperature data is unavailable for the Lafayette, Pilot, and Radford stations.

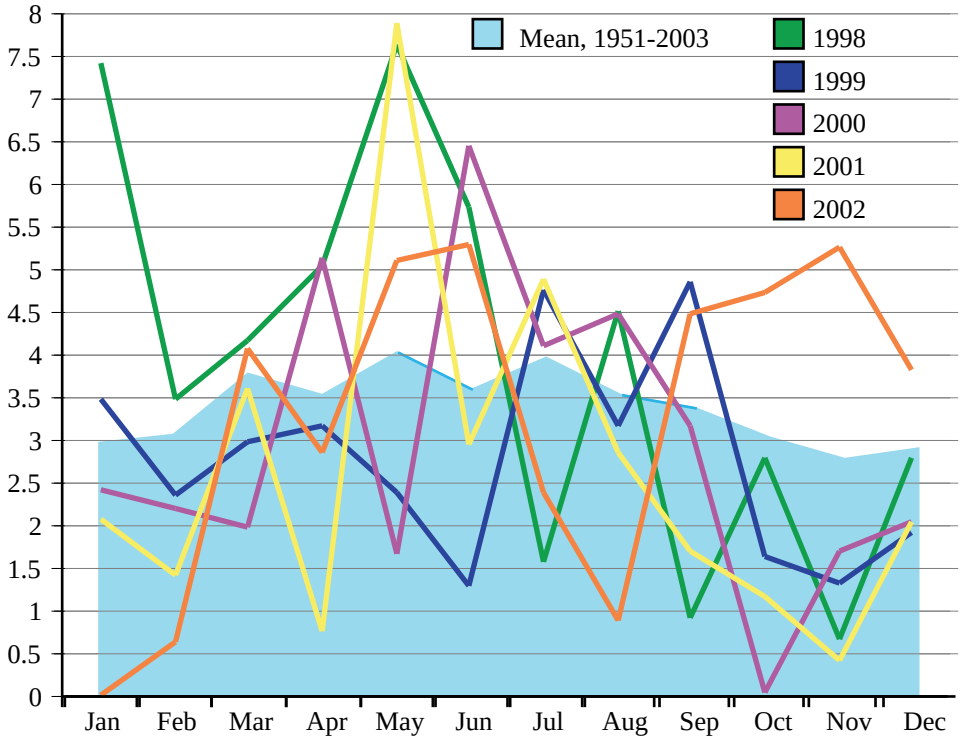
separate watersheds. East of the Divide, the streams and runoff contribute to the headwaters of the James River, which flows into the Chesapeake Bay, and the north and south forks of Roanoke River, which merge at Lafayette and flow into Albemarle Sound on the North Carolina coast. To the west, the water enters the New River, part of the much larger Mississippi River watershed which empties into the Gulf of Mexico.

The Continental Divide defines far more than the flow of ground and surface water. To the east of the Divide, the valleys narrow, bordered by moderately steep ridges. To the west, the land in the New River Drainage Basin is marked by gently rolling land, Although there are mountainous areas on the west side of the divide, their sides and ridges are far more moderately sloped. The degree of slopes, east and west, have an impact on the type, degree, and impact of runoff from construction, logging operations, and other land uses. On steeper slopes, runoff has less chance to be absorbed into and filtered by the soil and vegetation. Any construction or land use that increases runoff on steeper slopes will potentially contribute to additional flooding, increased silt in streams, and loss of top soil.

Climate

The climate in Montgomery County is generally mild, with temperatures ranging from average low of 20.4° in January to an average high of 82.7°in July. Depending on the area of the County, the average annual precipitation varies, between 40.52” in the Blacksburg area to 38.32” in Lafayette, 38.54” in Pilot, and 36.28 “ in Radford. Just as the precipitation amounts vary depending on the area of Montgomery County, so too does the time of the year when the greatest precipitation is likely to occur. In the Blacksburg and Radford areas, May is the wettest month, with an average of 4.02” and 3.5” of precipitation, respectively. For eastern and southern Montgomery County, July is the wettest month, with an average of 3.96” in Lafayette and 3.94”

Portrait of a Drought: Blacksburg 3 SE, VA (440766), 1998-2002



Note: At one time, Montgomery County had four climate stations: Blacksburg, Lafayette, Pilot, and Radford. The Pilot station was discontinued in 1985, and the Radford station was discontinued in 1992. Subsequently, there is no data available for the parts of Montgomery County most effected by the 1998-2002 drought. The Blacksburg station data was chosen because the Blacksburg station typically has the greatest amount of precipitation annually.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average	2.97	3.05	3.78	3.54	4.02	3.58	3.97	3.52	3.37	3.03	2.79	2.91	40.52
1997	3.15	2.47	4.01	2.32	2.26	5.03	2.61	1.97	3.18	1.47	2.46	2.64	33.57
1998	7.41	3.48	4.15	5.02	7.61	5.73	1.56	4.51	0.91	2.79	0.67	2.77	46.61
1999	3.47	2.33	2.97	3.17	2.39	1.28	4.75	3.17	4.85	1.64	1.31	1.92	33.25
2000	2.4	2.2	1.98	5.13	1.66	6.44	4.08	4.46	3.16	0.02	1.69	2.02	35.24
2001	2.07	1.42	3.6	0.74	7.86	2.94	4.87	2.83	1.69	1.17	0.41	2.02	31.62
2002	0	0.62	4.05	2.83	5.08	5.27	2.37	0.87	4.47	4.73	5.24	3.81	39.34
2003	1.21	6.31	3.08	4.43	6.18	7.57	7.75	2.64	4.06	1.8	3.87	2.7	51.6

Southeast Regional Climate Center, 2004

in Pilot.

Air Quality

Air quality data for Montgomery County is a bit thin or outdated primarily because there is no air monitoring station in the County and the relevant Environmental Protection Agency (EPA) data does not extend beyond 1999. The closest monitoring station is located in the Roanoke Valley. Because of geography, larger population, and denser development, the data is not applicable to Montgomery County and the New River Valley. Indeed, the lack of an air quality monitoring station was raised as a concern by participants in the community survey.

Data on air pollutants and emissions from specific facilities is available, however the data is five years out of date, so there is no way of determining whether conditions have improved or deteriorated. Data from the EPA indicates there are 67 commercial and government operations in Montgomery County which produce and release pollutants into the air. As the point sources of pollutant emissions map (left) indicates, there are high concentrations of point sources in the Blacksburg Industrial Park, in northeast Christiansburg, and at the Radford Arsenal.

Water Quality

Unlike air quality, there are water quality monitoring stations in Montgomery County. In addition, the Save Our Streams program, administered by the Virginia Natural History Museum, uses volunteers to monitor streams.

According to the EPA, nine facilities have permission to discharge pollutants into the surface waters in Montgomery County. In addition, there are 27 community water systems (homes and businesses), 11 transient water systems (rest areas, camp grounds, and gas stations), and 3 non-transient, non-community water systems (schools) in Montgomery County.

The majority of the consolidated facilities

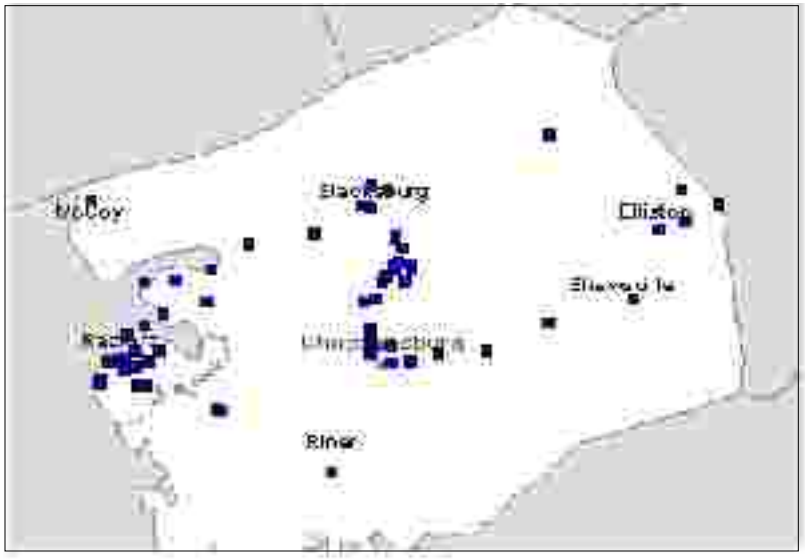
Montgomery County: Total Facility Emissions for Criteria Air Pollutants, 1996 and 1999

Emissions in short tons (2,000 lbs) per year.

Pollutant	1996	1999	Emissions Density, 1999 (Tons per Square Mile)
Carbon Monoxide	1024	158	52-130
Nitrogen Oxides	377	1372	11-32
Sulfur Dioxide	1073	3277	2.6-20
Volatile Organic Compounds	1124	1190	9.4-23
Particulate (size < 2.5 micrometers)	527	83.4	2.1-3.5
Particulate (size < 10 micrometers)	626	133	7.8-13
Ammonia	0.31	0.32	1.7-2.9
		Total	96-260

Note: Although the EPA data indicated between 10 and 15 contributing sources for the above totals, two facilities generated the majority of the emissions: Radford Arsenal and Virginia Tech. There is no indication of the amount of emissions contributed by non- or multi-point sources, most specifically automobiles.
Source: U.S. Environmental Protection Agency, AirNOW, 2004.

Point Sources of Pollutant Emissions, 2003



Source: U.S. Environmental Protection Agency, EnviroMapper, 2004

with permits to discharge to water are wastewater treatment plants, including the Blacksburg Country Club STP, BVPISA Waste water treatment facility, the Town of Christiansburg, the Montgomery County PSA, the Riner Town Sewage Treatment facility, the Shawsville Town Sewage Treatment facility, and Virginia Tech Water Supply. The remaining facilities are located at two corporate sites: Federal Mogul and the Radford Arsenal.

Of the 27 community drinking water systems, located in Montgomery County, 11 purchased treated surface water, 12 use ground water, and the remaining two (Blacksburg-Christiansburg-VPI Water Authority and the Radford Arsenal) use surface water, primarily drawn from the New River. Public systems provide drinking water to 54,270 residents (in the combined jurisdictions. The remaining systems are either privately operated or are specific to a subdivision, manufactured housing park, or industry.

Impaired Streams (1)

The Virginia Department of Environmental Quality, which is tasked with monitoring Total Maximum Daily Loads (TMDL) in accordance with regulations from the federal Clean Water Act, identified eight streams or portions of streams impaired by man-made causes and 1 stream impaired by natural causes in two watersheds: the Roanoke River and the New River. With the exception of Wilson Creek, none of the stream impairments had a single cause. Of the eight streams, two were impaired by general standard (benthic) causes, six by agricultural causes, six by urban causes, and two (both in the area west of Riner) by domestic septage from private septic systems.

Soils (2)

1. A map of the impaired streams in Montgomery County is included in the Environmental Atlas at the end of this introduction.

Montgomery County: Impaired Streams, 2002
(2002 303(d) Total Maximum Daily Load Priority List)

Watershed / River or Stream	Length	Cause	Source
Roanoke River	15.31	Temperature	Natural Conditions
Roanoke: North Fork	6.56 miles	Fecal Coliform; Metals in fish tissue	NPS-Urban; Unknown
Roanoke: Wilson Creek	6.91 miles	Fecal Coliform	NPS-Urban
New River: Crab Creek	12 miles	Fecal Coliform	NPS Agriculture/Urban
		General Standard (Benthic)	NPS Agriculture/Urban
New River: Meadow Creek	4.48 miles	Fecal Coliform	Agriculture/Wildlife/ Domestic Septage
New River: Little River	1.29 miles	Fecal Coliform	NPS-Agriculture/Wildlife
New River: Mill Creek	15.27 miles	Fecal Coliform	NPS-Agriculture/Wildlife Domestic Septage
Stroubles Creek	7.08 miles	Fecal coliform;	NPS Agriculture/Urban;
		General Standard (Benthic) 4.98	NPS Agriculture/Urban
New River	52.08 miles	Fissue Tissue-PCBs	VDH Fish Consumption Advisory / Unknown

Notes:
1. The only point source cited by the DEQ was the Radford Army Arsenal Plant, which discharged Ammonia (71.59) into the New River (Water Quality Based Effluent Waters 2002 303(d) TMDL Priority List).
2. NPS = Non-point source
Source: Virginia Department of Environmental Quality, 2004

According to the USDA Soil Conservation Service *Soil Survey of Montgomery County* (1980, 1982) Montgomery County has seven primary soil types: 1) Groseclose-Poplimento-Duffield, 2) Caneyville-Opequon-Rock outcrop, 3) Berks-Groseclose-Lowell, 4) Berks-Lowell-Rayne, 5) Berks-Weikert, 6) Glenig-Parker, and 7) Unison-Braddock.

The soil types, in Montgomery County, align with other features and land uses. Areas with both geologic faults and, in two cases (Price Mountain and Brush Mountain) semi-anthracite coal seams, have Berks-Weikert soils, overlaying an acid shale and sandstone residuum bedrock. Areas with significant karst features, most notably in the Roanoke River (North and South Fork) and the Toms Creek watersheds, are characterized by Caneyville-Opequon-Rock outcrop, Berks-Lowell- Groseclose, and Groseclose-Poplimento-Duffield soils, all of which overlay limestone bedrock formations. Farmland in Montgomery County is located, primarily, in areas with Groseclose-Poplimento-Duffield, Berks-Groseclose-Lowell, and Unison Braddock soils, although only Unison-Braddock, an alluvium soil found along the New River, is considered prime soil by the US Department of Agriculture.

2. A description of each of the soil types can be found in the glossary under soils. A soil map for the county is include in the Environmental Atlas at the end of this introduction.

Geology and Karst (3)

As the description of the soils indicates, a large portion of Montgomery County sits on limestone, shale, and sandstone bedrock and is characterized by a karst topography, including sink holes and caves. Inasmuch as karst is a feature associated with limestone, little, if any karst features are prevalent in the area southwest of Riner and south into Floyd County.

Until the 1940s and early 1950s, Montgomery County had a significant semi-anthracite coal mining industry, centered on Brush and Price Mountains. Although the coal still exists in the two locations, the cost of removal and environmental constraints made mining in those two locations prohibitive. Currently, mining, in Montgomery County, is limited to quarrying limestone southeast of Blacksburg and west of Shawsville.

Vegetation and Endangered and Threatened Species (4)

Much of the vegetation in Montgomery County is typical of mixed hardwood/conifer forests, with white oak, red maple, northern red oak, white ash, white pine, and Virginia pine on the southern and southwestern slopes and scarlet oak and chestnut oak on the northern and northeastern slopes.

On April 22, 2004, Representative Rick Boucher and Senator John Warner introduced the "Virginia Ridge and Valley Wilderness and National Scenic Areas Act of 2004." The bill would designate the portion of Brush Mountain, extending from Blacksburg east into Craig County, as the Brush Mountain Wilderness Area (4,707 acres in Montgomery County) and the Brush Mountain East Wilderness Area (3,800

3. Maps dealing with Geology, Surficial Geology, Karst, and Mines can be found in the Environmental Atlas at the end of this introduction.
4. The Threatened and Endangeres Species map can be found in the Environmental Atlas at the end of this introduction.

Montgomery County: Rare and Endangered Species, 2004

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status	Date Last Obs.
Amphibian						
Cryptobranchus alleganiensis	Hellbender	G3G4	S2S3		SC	1979
Bivalvia (Mussels)						
Lasmigona subviridis	Green Floater	G3	S2		SC	1981
Natural Communities						
Natural Community	Appalachian Cave Drip Pool/epikarstic Community	G2	S2	SOC		1970
Crustacea (Amphipods, Isopods, & Decapods						
Caecidotea vandeli	Vandel's Cave Isopod	G2G3	S1S2	SOC		1969
Stygobromus estesi	Craig County Cave Amphipod	G1G2	S1S2	SOC		1999
Stygobromus fergusoni	Montgomery County Cave Amphipod	G1G2	S1	SOC		1969
Diplopoda (Millipedes)						
Pseudotremia cavernarum	Ellett Valley Pseudotremia Millipede	G2G4	S1		LT	ND
Diplura (Diplurans)						
Litocampa sp. 3	A Cave Dipluran	G2	S2	SOC		1971
Fish						
Noturus gilberti	Orangefin Madtom	G2	S2	SOC	LT	1989
Percina rex	Roanoke Logperch	G1G2	S1S2	LE	LE	1986
Lepidoptera (Butterflies & Moths)						
Pyrgus centaurae wyandot	Appalachian Grizzled Skipper	G2	S1S2	SOC	LT	1975
Mammals						
Myotis sodalis Vascular Plants	Indiana Bat	G2	S1	LE	LE	1947
Vascular Plants						
Buckleya distichophylla	Piratebush	G2	S2	SOC		1996
Clematis addisonii	Addison's Leatherflower	G2	S2	SOC		2001
Echinacea laevigata	Smooth Coneflower	G2	S2	LE	LT	2002
Paxistima canbyi	Canby's Mountain-lover	G2	S2	SOC		1993
Phlox buckleyi	Sword-leaved Phlox	G2	S2	SOC		1992

Note: Department of Conservation & Recreation Codes: S1=extremely rare; S2=very rare; S3=rare to uncommon; S4=common; G refers to Global Rank, with numbers coinciding with state numbers. LE= listed endangered; LT=listed threatened; SOC=species of concern; SC=special concern. DCR, 2004.

acres in Craig County). Among other things, the bill would require the development of a trail plan for hiking, mountain bike, and equestrian trails, consistent with the Wilderness Act.

Montgomery County is part of the Virginia Department of Conservation and Recreation's (DCR) "ridge and valley physiographic province." Specifically, the County is recognized for its karst features, including caves, and for its dolomite glades. Currently, Montgomery County has 18 threatened or endangered species. Of these, three are federally designated as endangered species: the Roanoke logperch (a fish), the Indiana bat, and the smooth coneflower.

Hazards and Hazard Mitigation (5)

In the spring, 2004, the New River Valley Planning District Commission released the *New River Valley Hazard Mitigation Plan 2004* in response to the passage of the Disaster Mitigation Act of 2000, which requires that state and local governments adopt mitigation plans by November 1, 2004 or be deemed ineligible for future FEMA assistance. (6)

In the years between 1969 and 2002, there were 28 Presidential Disaster Declarations issued in Virginia, 50% of which have included the New River Valley. Most of the disasters were from flooding, winter weather (blizzards, storms, and ice), and hurricane-related storms (Camille, Agnes, and Fran). An additional Federal Disaster declaration was issued for Montgomery County following a storm that resulted both in ice and in flooding. Finally, the US Department of Agriculture, in 2000, declared a USDA Disaster, based on the severe drought which started in 1999 and lasted until 2002 and resulted in $2,700,000 in farm facility and livestock weight losses in Montgomery County alone.

Of the hazards included in the Planning District Commission's hazard assessment, flooding, most specifically flash flooding, is the most prevalent natural hazard in Montgomery County. The *New River Valley Hazard Mitigation Plan 2004* cites sixteen specific flooding sources in the County.

According to the New River Valley PDC, as of "December, 2002, the National Flood Insurance Policies inforce in Montgomery County covered $15,289,700 in the unincorporated portions of the County, $2,386,900 in Blacksburg, and $2,485,200 in Christiansburg." Finally, the Hazard Mitigation Plan identified the areas along the South Fork of the Roanoke River and the Roanoke River as "Special Flood Hazard Area," in part because of the range of structures at risk during a major flood event, including Shawsville Elementary School, the Elliston Wastewater Treatment Plant, and some 85 homes. Other areas prone to flooding include the densely developed area along Plum Creek and portions of Blacksburg and along Crab Creek in Christiansburg.

Flooding and flash flooding, however, are not the only hazards in Montgomery County. As the years between 1998 and 2002 amply demonstrate, portions of Montgomery County were highly susceptible to the drought conditions, conditions which resulted in 370 dry wells and springs. As the annual and

Montgomery County: Flooding Sources, 2004

Roanoke River Watershed:
- Roanoke River
- North Fork Roanoke River
  - Bradshaw Creek
  - Indian Run
- South Fork Roanoke River
  - Spring Branch
  - Bottom Creek
  - Elliot Creek
  - Goose Creek

New River Watershed:
- New River
  - Toms Creek
  - Slate Branch
  - Stroubles Creek
  - Plum Creek
  - Crab Creek
- Little River

James River Watershed:
- Craig Creek

Source: New River Valley Planning District Commission, *The New River Valley Hazard Mitigation Plan*, 2004.

Photo by Bill Edmonds

5. Unless otherwise noted, the information in hazards and hazard mitigation portion of this introduction was taken from the New River Valley Planning District Commission's draft version of the *New River Valley Hazard Mitigation Plan 2004*. The PDC map is included in the atlas.
6. According to the Disaster Mitigation Act of 2000, "local mitigation plans must include: 1) a planning process; 2) risk assessment, including the types of hazards and vulnerabilities; 3) mitigation strategy, including goals, analysis of options, and action plan; and 4) plan maintenance process, including methods of monitoring, evaluating and updating within a five year cycle." In addition, the act requires that jurisdictions take an "all natural hazards planning" approach, including consideration of atmospheric, hydrologic, and geologic hazards, as well as other types of hazards (wildfires, subsidence in karst areas, etc.). It is important to note that "hazard" is defined as "an even or physical condition that has the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, damage to the environment, interruption of business, or other types of harm or loss."

monthly precipitation averages indicate, the southern and western portions of Montgomery County were far drier than either the northern or eastern areas. Unfortunately, the climate stations in those two areas were closed well in advance of the 1998-2002 drought, so data is unavailable.

Other hazards identified by the *New River Valley Hazard Mitigation Plan 2004* include: severe weather (snow, ice, lightening, cold, and hail), wildfires, subsiding sink holes and mines, and earthquakes. It should be noted that, despite the number of faultlines in Montgomery County, no major earthquakes have had their epicenter in the County, although earthquakes have occurred in both Giles and Pulaski Counties.

Of the remaining hazards, Montgomery County is most likely to have problems with severe weather. In recent years, ice has proven to be a greater problem, countywide, than other weather related events, although the winter's ice storms have led to only one Presidential Disaster Declaration in 1994. Presidential Disaster Declarations have also been issued in the region for winter storms (2000), blizzards (1996), and snowstorms (1993)

Montgomery County averages 68 fires per five year period. While fires in the County do not occur on a grand scale (average size is 2.1 acres), the amount of development, including subdivisions, into the forested lands in the county increases the chances of significant property damage if a large scale fire, in fact, occurs.

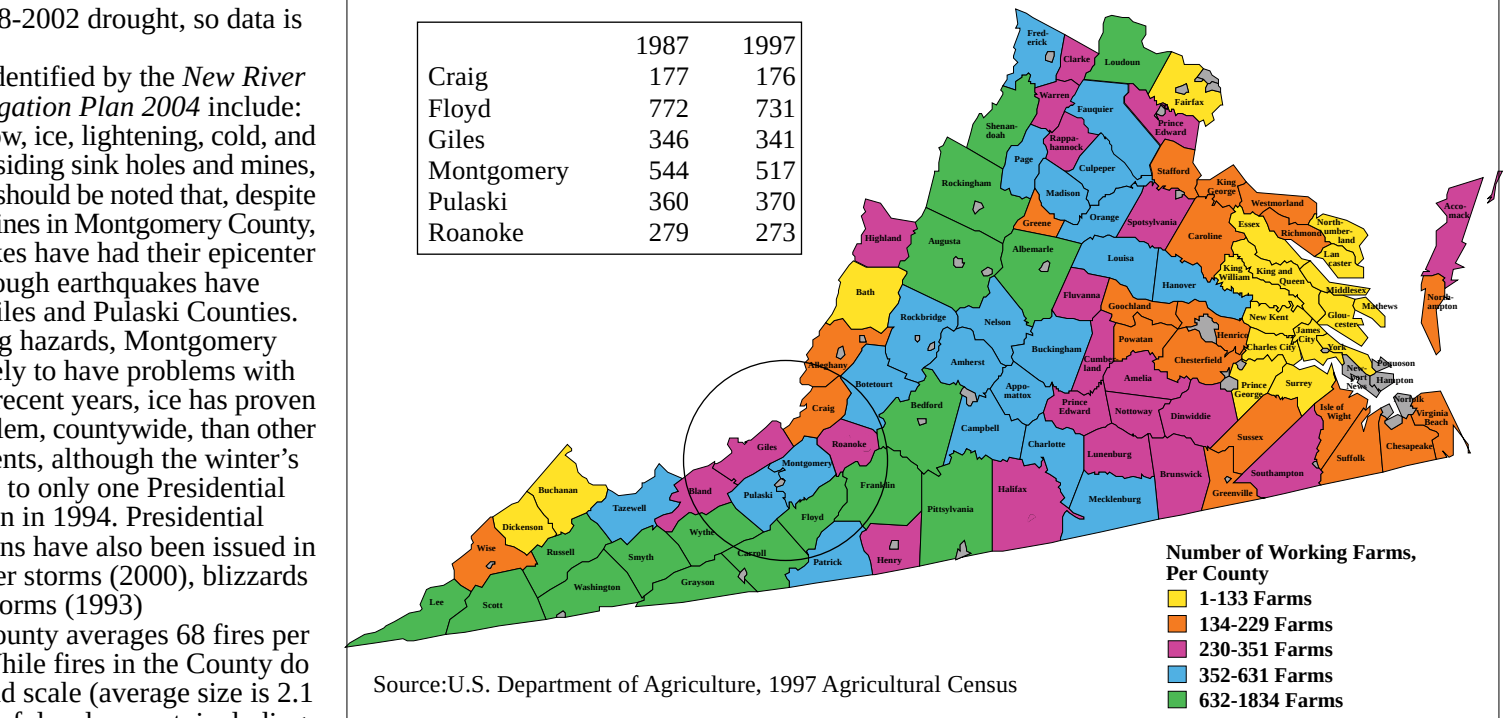
Agriculture (7)

In the spring of 2000, the Montgomery County Planning Commission and Planning Staff held a series of community meetings in the four planning districts (Mount Tabor, Prices Fork, Riner, and Shawsville). Reactions from meeting participants indicated an almost

7. A map of the Agricultural and Forestal Districts and Land Use Assessment designations is included in the Environmental Atlas.

Number of Working Farms in Virginia, 1997

	1987	1997
Craig	177	176
Floyd	772	731
Giles	346	341
Montgomery	544	517
Pulaski	360	370
Roanoke	279	273



Source:U.S. Department of Agriculture, 1997 Agricultural Census

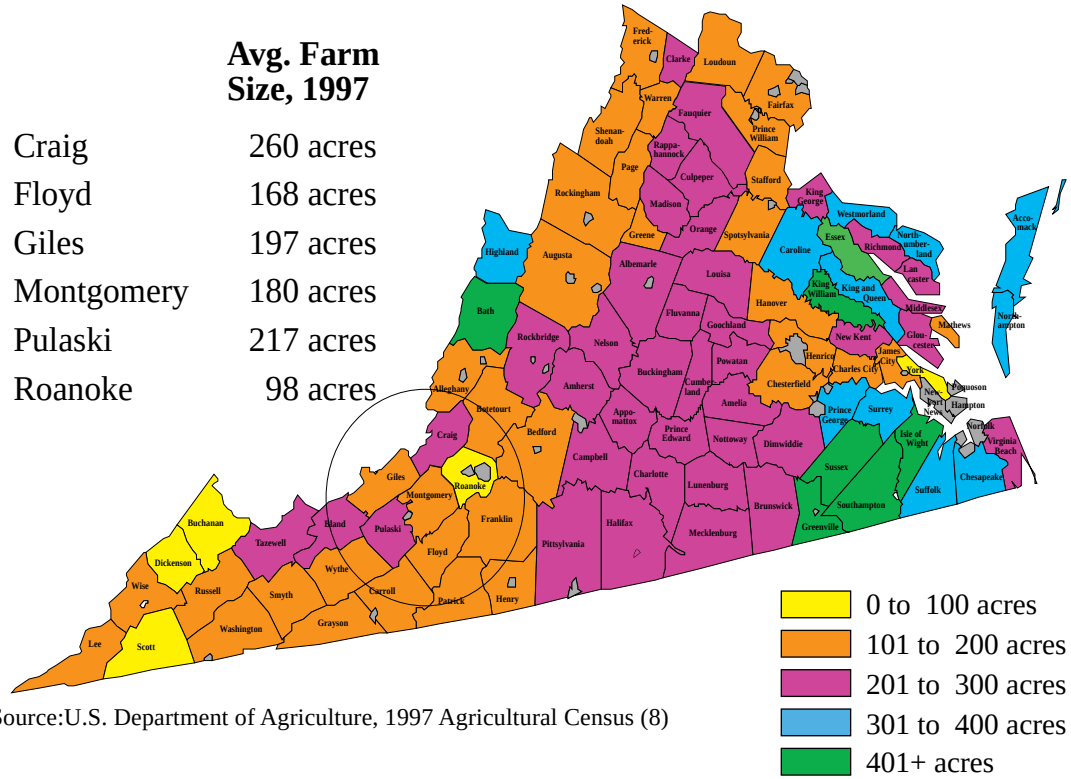
Photo by Robert Parker

Montgomery & Neighboring Counties: Number of Farms and Acreage, 1997

	#of farms	Acreage
Craig	176	45684
Floyd	731	122613
Giles	341	67245
Montgomery	517	93074
Pulaski	370	80406
Roanoke	273	26688

Virginia: Average Size of Farms, in Acres, 1997

	Avg. Farm Size, 1997
Craig	260 acres
Floyd	168 acres
Giles	197 acres
Montgomery	180 acres
Pulaski	217 acres
Roanoke	98 acres



Source:U.S. Department of Agriculture, 1997 Agricultural Census (8)

universal concern over the loss of open space and agricultural lands and the degradation of environmental quality during the previous two decades. As evidence, the participants pointed to the large-scale suburban developments on the southern slope of Brush Mountain and on the agricultural lands surrounding Riner. Indeed, one need only drive south on Route 8 or through the 460 corridor between Blacksburg and Christiansburg to note the changes in the land use patterns since the early 1980s.

According to the 2000 Virginia Agricultural Statistics Bulletin, published by the Virginia Agriculture Statistics Service, Montgomery County had 517 farms covering 93,074 acres. The number, however, is misleading because it includes not only the large scale working farms, but hobby and part-time farms as well. As is noted later in this chapter, very few of the farms in Montgomery County are large enough to provide sole support for the families living onsite.

While cultural definitions of farms are more often linked to images of the large scale operations in the Midwest, the Commerce Department's definition uses a far more broadly drawn base criteria. According to the Commerce Department, based on the definition used in the 1974 census, a farm is any property or place which produced and sold $1,000 or more in agricultural products during the census year. The definition, however, varies according to area and to state. The Virginia Land Use definition requires that a property consistently produce and sell $1,000 or more in agricultural products over a five year period in order to qualify for the land use program. In any case, the definitions allow for a broader range of farms than one might suppose.

Of the six counties included in this study, two of the counties, Floyd and Montgomery, have consistently lost farms since 1987. Of the remaining four, three (Craig, Giles, and Roanoke counties) have shown a gain in the number of farms between 1992 and 1997, following an initial loss of farms between 1987 and 1992. The gains in the number of farms in those counties in the years between 1992 and 1997, however, did not make up for the losses incurred in the previous five year period. Only Pulaski County saw a net gain in the number of farms during the 10 year period of this study.

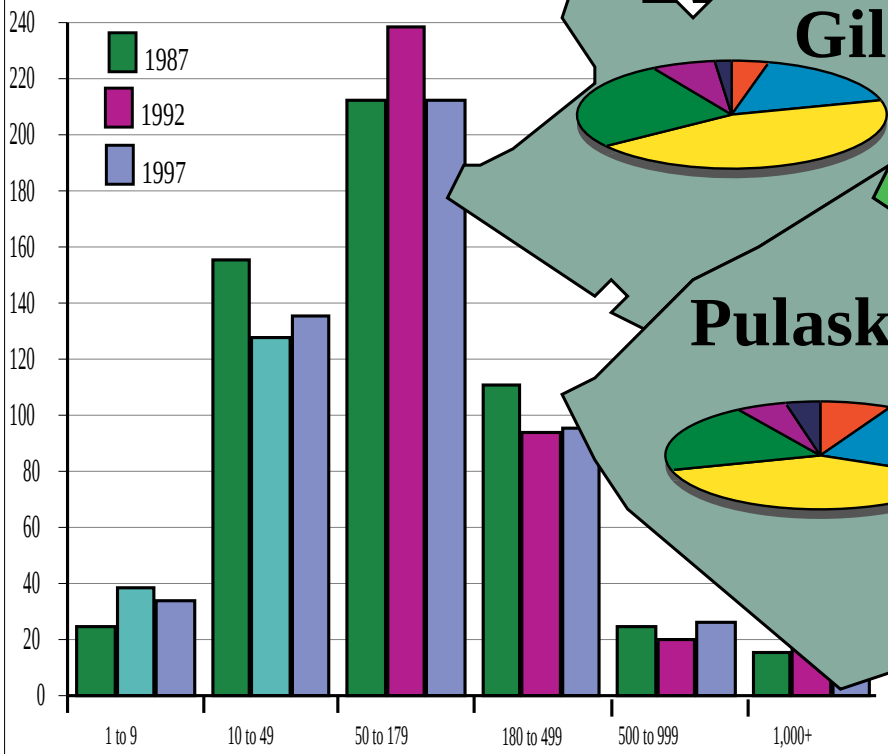
In Montgomery County, the most dramatic loss of farms occurred in the years between 1992 and 1997. In the five years prior to the revision of the Subdivision Ordinance in 1993,

8 The agriculture portion of this introduction was written during the summer of 2002 and reflects available data at that time. In the intervening years, additional agricultural land has been lost, but the introduction of the sliding scale in the 1999 Zoning Ordinance significantly reduced the rate of loss. The study draws heavily on census information from both the U.S. Census and the U.S and Virginia Departments of Agriculture and Forestry, and the U.S. Department of Commerce's 1987, 1992, and 1997 Censuses of Agriculture. One caveat, however, the Commerce Department completes their agricultural census every five years (in years ending in 2 and 7); however, the county-level information is not released until two to three years later. While the USDA is performing a new Agricultural Census this year, the information for Virginia Counties is not slated to be released until 2004, which effectively limits the currency of the census data. Where applicable, the information has been supplemented with rezoning and special use permit data for the years since 1997 and by the 1999 and 2000 Virginia Agricultural Statistics Bulletin. Additional information was provided by the Virginia Tech/ Montgomery County Extension Office and the U.S. Forest Service.

Montgomery & Neighboring Counties: Distribution of Farms, by Size, 1997

Montgomery County, Distribution of Farms, By Size, 1987-1997

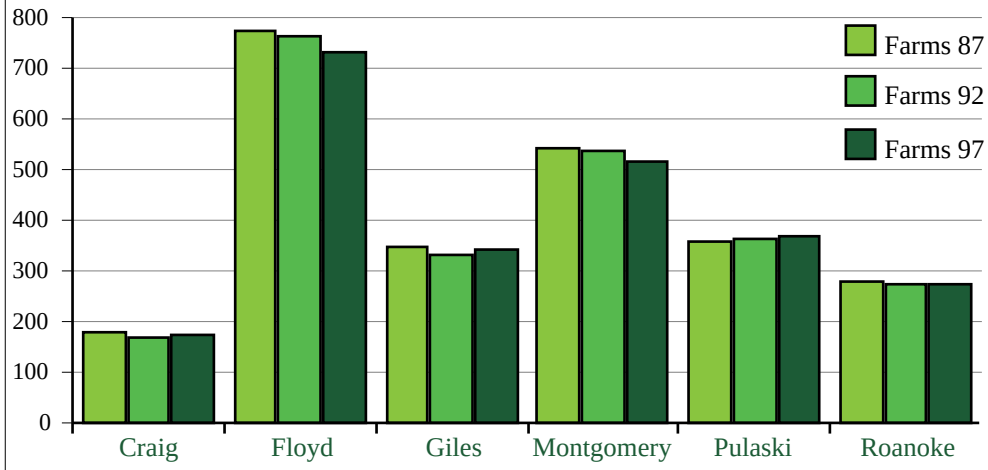
Farms by size:	1987	1992	1997
1 to 9 acres	25	39	34
10 to 49 acres	156	128	136
50 to 179 acres	213	238	213
180 to 499 acres	111	94	96
500 to 999 acres	24	20	26
1,000 acres or more	15	18	12



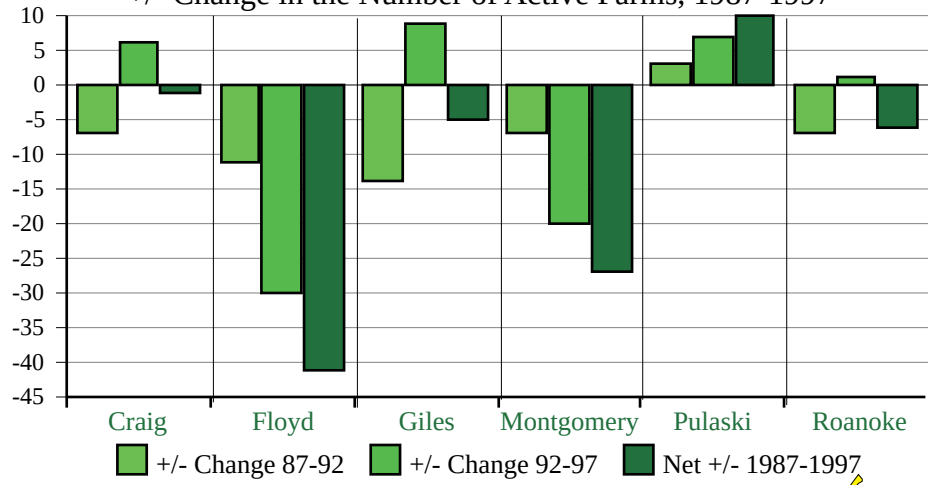
Source: U.S. Department of Commerce, 1987, 1992, 1997 Agricultural Census

Montgomery County & Neighboring Counties: Changes in Agriculture, 1987-1997

Number of Active Farms, 1987-1997

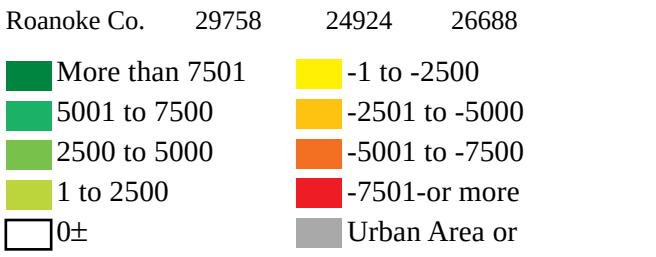


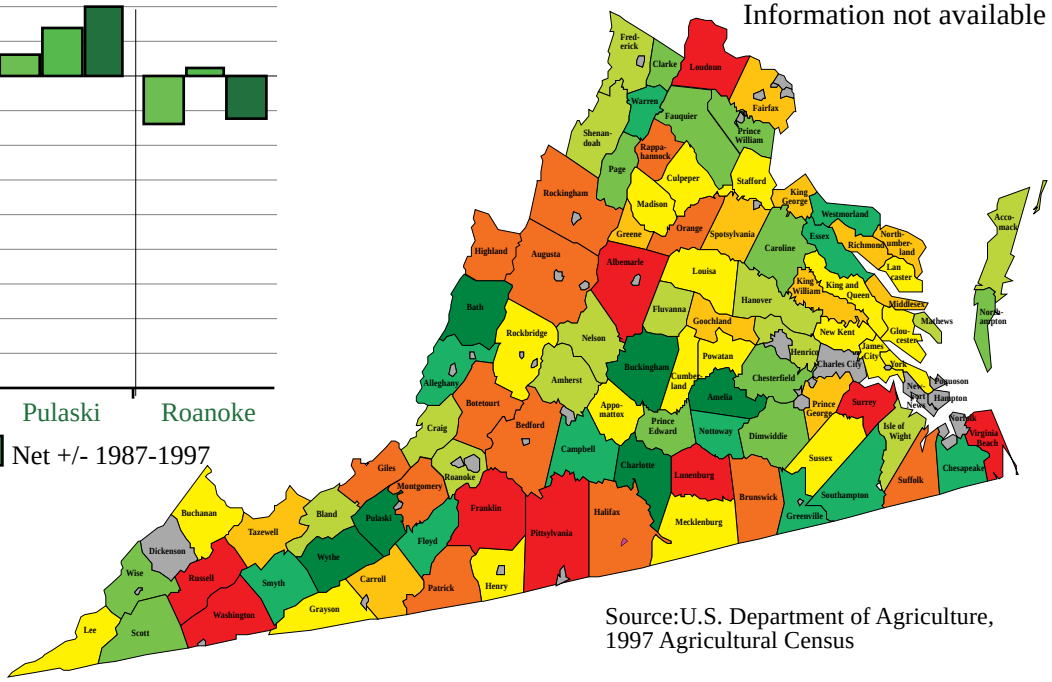
+/- Change in the Number of Active Farms, 1987-1997



Change in Agricultural Acreage: by County, 1992-1997

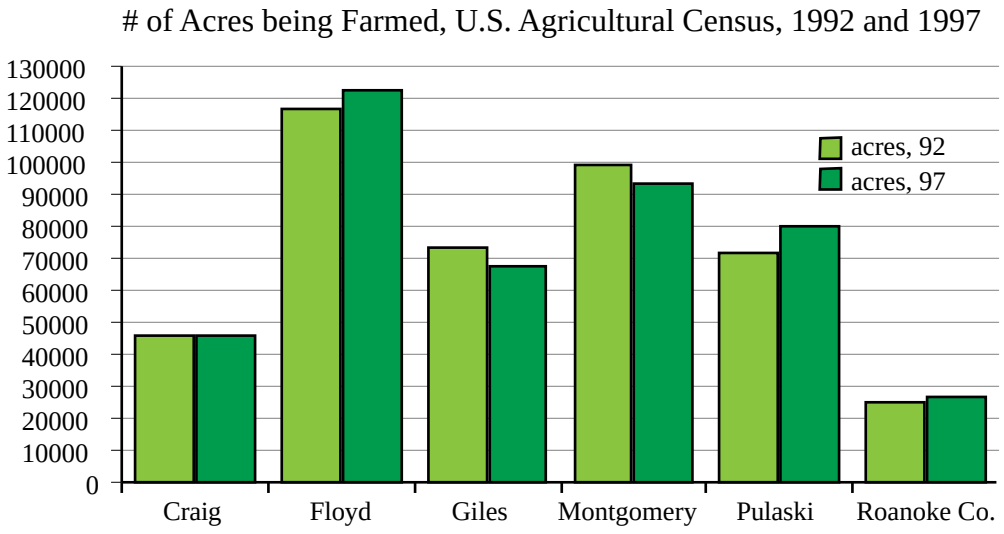
	Acreage, 1987	Acreage, 1992	Acreage, 1997
Craig	50308	45451	45684
Floyd	118115	116509	122613
Giles	71550	73097	67245
Montgomery	97319	98914	93074
Pulaski	78577	71803	80406
Roanoke Co.	29758	24924	26688





Source:U.S. Department of Agriculture, 1997 Agricultural Census

Montgomery and Neighboring Counties: Changes in Agriculture,1987-1997



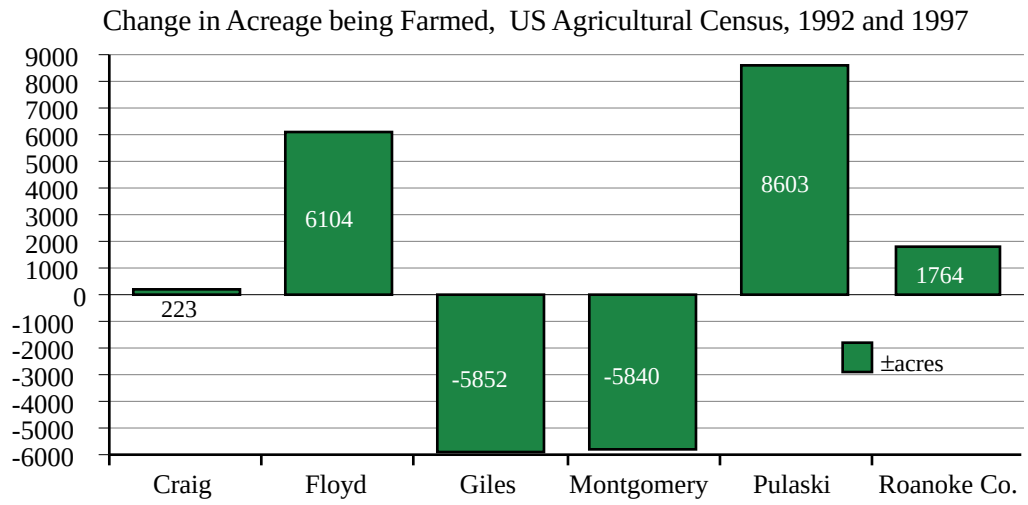


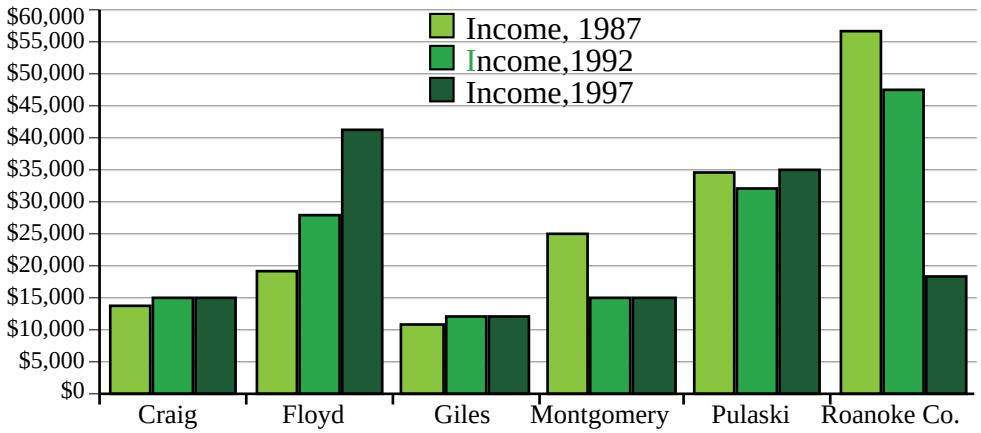
Photo by Robert Parker

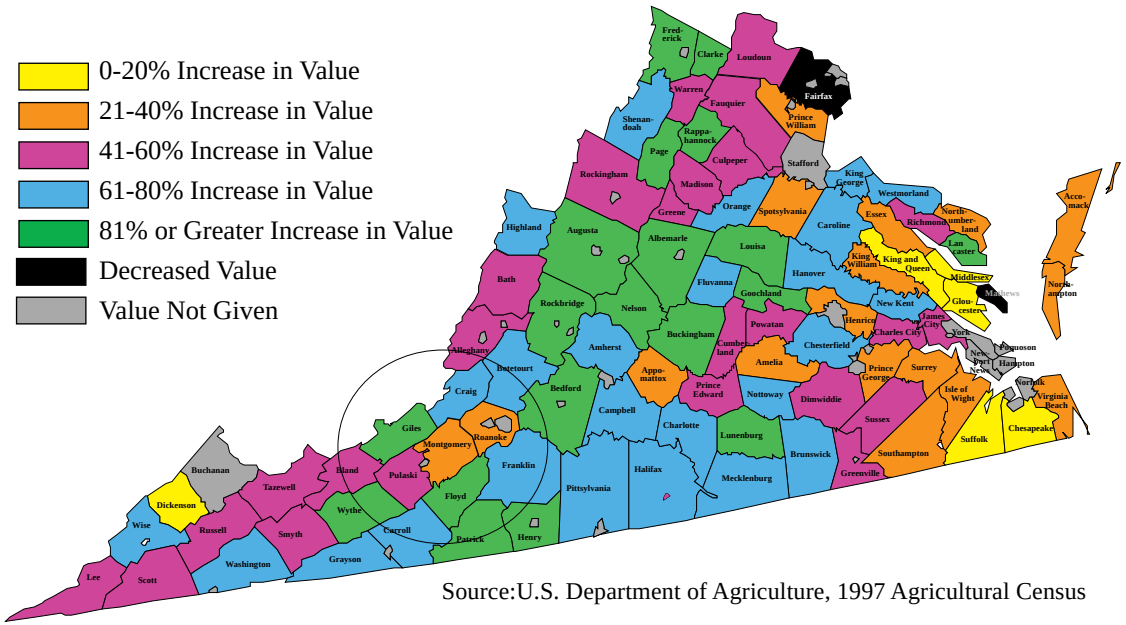
Montgomery County actually gained 1,595 acres of agricultural land. In the five years following the passage of the ordinance, Montgomery County lost 5840 acres. Of the agricultural acres lost, 25.7% were rezoned to accommodate high-density residential or business uses. An additional 18.6% were developed into large-lot subdivisions. The remaining farmland was lost to a combination of uses, although the primary losses were due to minor and family subdivisions. Finally, between 1990 and 2002, a minimum of 12,315 acres were subdivided. The actual number is higher, but the County did not track minor and family nor were landowners required to submit their minor or family subdivision plats for approval prior to the revision of the Subdivision Ordinance.

It should be noted that the passage of the 1999 Zoning Ordinance and the introduction of the sliding scale and rural residential zoning have significantly decreased the number of

Montgomery and Neighboring Counties: Farm Income and the Value of Land, 1987-1997

Average Farm Income: 1987, 1992, and 1997





Source:U.S. Department of Agriculture, 1997 Agricultural Census

Photo by Robert Parker

major subdivisions being sited in the A-1 district. In 2001, 8.5 acres were rezoned from A-1 (Agriculture) to either a residential or commercial use. Among other features, the 1999 Zoning Ordinance removed major subdivisions as a by-right use in the A-1 district, requiring subdividers to rezone to R-R (Rural Residential) and made the denser development dependent on the provision of public water and sewer not available in much of the agricultural and rural areas of the County. Despite changing requirements, minor and family subdivisions continue to have an effect, accounting for the subdivision of 676 acres and 2348 acres respectively between January of 2000 and December of 2002. The majority, but not all, of the minor and family subdivisions occurred in agricultural or rural districts.

Environmental Resources: Goals

ENV 1.0 Natural Resource Stewardship: The County is committed to preserving, conserving, and managing its natural resources, as a sustainable asset, for the benefit of its citizens and future generations.

ENV 1.1 Stewardship: Encourage funding of Department of Forestry and Virginia Extension Service programs to help encourage good stewardship of Montgomery County's natural resources.

ENV 1.2 Resource Management: Encourage the use of Forestry and Agriculture Best Management Practices (BMP's). (9)

ENV 1.3 Environmental Planning and Mapping: Develop a natural and critical resources geographic information system to facilitate effective environmental planning in Montgomery County, including: Critical Resources Map; Comprehensive Plan; Land Use Policy Map; Comprehensive Plan GIS Significant historic structures and districts (see Cultural Resources chapter); Groundwater and surface water resources; Floodplains; Karst terrain; Soils; Vegetation; Geology and geologic features (other than karst); Rare and endangered species; Well and septic systems; Agricultural and Forestal Districts; Conservation easements; and State and federal lands. (10)

ENV 1.3.1 Environmental GIS Program: Initiated a mapping program to produce large-scale maps optimal for environmental planning for the entire county. Maps should be produced at a scale of 1:2,400 with a 5-foot contour interval for the fast growth areas of the county, and a scale of 1:4,800 with a 10-foot contour interval for slow growth areas of the County.

ENV 1.3.2 Well and Septic GIS Data: Work with the NRV Health Department to expand a current Floyd County program for gathering GPS data on new septic and well systems into Montgomery County. Use the GPS data to develop a GIS-based location map for septic systems and wells that can tie into the database to easily monitor areas where septic failures and well contamination are concentrated. (11)

ENV 1.3.3 Bedrock Geology Maps: Create bedrock geology maps, similar to Geology of the Blacksburg Quadrangle, Virginia, for areas of Montgomery County in the following United States Geological Survey Quadrangle Maps: Eggleston, Newport, McDonalds Mill, Glenver, Elliston, Ironto, Radford North, Radford South, Riner, Pilot, Check, Indian Valley, and Alum Ridge. Priority should be given to the fast developing areas around Blacksburg, Christiansburg, and Radford.

ENV 1.3.4 Karst GIS Database: Identify and provide information that will be useful in land use decision making for each sinkhole, sinking creek, cave, karst spring, etc. This information should include, at a minimum, the precise location (recorded by GPS), type, and size of the karst feature, as well as issues of concern that may require future monitoring of the feature. (12)

ENV 1.3.5 Floodplain Mapping: Improve and update existing floodplain mapping data through continued requests to FEMA, while utilizing the resources of educational institutions, to re-delineate County floodplain boundaries. (13)

Cross References and Notes:
9. Best Management Practices (BMPs) are also encouraged in other sections of the Environmental Resource Goals, including: ENV 1.5: Water Quality (pg. 137); ENV 3.1 Agricultural Programs and Practices (pg. 141); ENV 5.5.2 Groundwater: Best Management Practices (pg.145); ENV 6.5.3 Karst: Erosion and Sediment Control (pg. 147); ENV 6.6 Karst: Best Management Practices (pg. 148); and ENV 7.1.5 Stormwater and Erosion Best Management Practices (pg. 149).
10. The environmental layers are part of a larger GIS system which Montgomery County is currently developing. GIS strategies are also include in Cultural Resources (CRS 1.2.2, pg. 81), Health and Human Services (HHS 3.2.2, pg. 176), Public Safety (SFY 1.1.5, pg. 197), Transportation (TRN 1.1.2, pg.219), and Utilities (UTL 1.4.3, pg. 235)

Cross References and Notes:
11. Well and Septic Systems are also addressed in ENV 3.3: Individual Septic Systems (pg. 142); ENV 5.1: Septic Systems and Well Water Testing (pg.144); ENV 5.2.1 Septic System Maintenance (pg.145); ENV 5.2.2: Alternative Wastewater Processing Systems (pg.145); ENV 5.3 Groundwater Quality Protection Programs and Policies (pg.145); ENV 5.5.3: Wastewater/water Recycling and Reclamation Programs (pg.146); ENV 5.7.2 Well Testing (pg.146); UTL 1.3 Private Systems (pg.235); and UTL 1.4 Individual Systems (pg.235).
12. Issues surrounding Karst are covered in greater detail in ENV 6.0: Karst (pg.147).
13. Floodplains are addressed in greater detail in ENV 4.0 (pg. 143).

ENV 1.4 Wildlife Corridors: Establish green spaces, including corridors and greenways, that promote viable wildlife habitat.

ENV 1.5 Water Quality*:* Develop and initiate water resource management and Best Management Practices (BMPs) to preserve and maintain ground and surface water quality. (14)

ENV 1.6 Air Quality: Routinely monitor air quality in the County to determine if air quality is declining.

ENV 1.6.1 Mass Transit: Encourage the use and development of mass transit systems in the County. (15)

ENV 1.6.2 Monitoring Station: Work with the Department of Environmental Quality and area universities to establish an air monitoring station in the Montgomery County.

ENV 1.7 Species Protection: Protect threatened and endangered plant and animal species in the County. Wildlife habitat management is a critical component due to the increasing development in the county.

ENV 2.0 Open Space and Natural Resource : To work with county residents to conserve the natural resources and agricultural character of the land in the county. (16)

ENV 2.1 Private Open Space: Encourage the preservation of the rural and agricultural character of private land within the County through cooperative efforts with local landowners.

ENV 2.1.1 Special Service Districts
ENV 2.1.2 Community Development Authorities
ENV 2.1.3 Agricultural/Forestal Districts
ENV 2.1.4 Sliding Scale Zoning
ENV 2.1.5 Rural Cluster Zoning
ENV 2.1.6 Conservation Easements
ENV 2.1.7 Rural Development Initiatives
ENV 2.1.8 Use Value Assessment
ENV 2.1.9 Urban Growth Boundaries [Urban and Village Expansion Areas]
ENV 2.1.12 Conservation Easements and Virginia Scenic Byways

ENV 2.2 Public Open Space: Encourage the acquisition and development of additional active and passive parklands and open space with the cooperation of Blacksburg, Christiansburg, Virginia Tech, and other related entities.

ENV 2.1.6 Conservation Easements
ENV 2.1.10 Public Land Acquisition Program
ENV 2.1.12 Conservation Easements and Virginia Scenic Byways

ENV 2.3 Viewsheds: Develop and enact a plan of action for the protection and preservation of the scenic byways and transportation corridors, rivers, tributaries, and ridgelines. (17)

ENV 2.1.1 Special Service Districts
ENV 2.1.2 Community Development Authorities

Cross References and Notes:
14. Groundwater concerns are addressed in ENV 5.0 (pg.144) and ENV 6.0: Karst (pg.147). Surface water concerns are addressed in ENV 3.0: Streams, Rivers, and Surface Waters (pg. 141) and ENV 4.0 Floodplains (pg. 143).
15. Mass Transit is also addressed in HHS 2.3 Transportation (pg. 175) and TRN 3.0: Mass Transit (pg. 176).

Cross References and Notes:
16.See the end of section 2.0 for the detailed list of strategies included in this section.
17. Scenic locations include Scenic Byways/Viewsheds (Route 8, Catawba Road, Prices Fork Road, Interstate 81, and Route 460), Rivers and Tributaries (New River, Little River, and North and South Forks of Roanoke River), and Ridgelines (Brush Mountain, Prices Mountain, and Paris Mountain).

ENV 2.1.4 Sliding Scale Zoning
ENV 2.1.5 Rural Cluster Zoning
ENV 2.1.6 Conservation Easements
ENV 2.1.7 Rural Development Initiatives
ENV 2.1.8 Use Value Assessment
ENV 2.1.9 Urban Growth Boundaries [Urban and Village Expansion Areas]
ENV 2.1.10 Public Land Acquisition Program
ENV 2.1.12 Conservation Easements and Virginia Scenic Byways

ENV 2.4 Forest Land: Minimize the loss of the County's productive forestlands.

ENV 2.1.3 Agricultural/Forestal Districts
ENV 2.1.6 Conservation Easements
ENV 2.1.7 Rural Development Initiatives
ENV 2.1.8 Use Value Assessment
ENV 2.1.9 Urban Growth Boundaries [Urban and Village Expansion Areas]
ENV 2.1.11 Educational and Informational Distribution Program
ENV 2.1.12 Conservation Easements and Virginia Scenic Byways

ENV 2.5 Agriculture: Maintain the agricultural land in various types of active production and discourage its conversion to other land uses.

ENV 2.1.3 Agricultural/Forestal Districts
ENV 2.1.4 Sliding Scale Zoning
ENV 2.1.5 Rural Cluster Zoning
ENV 2.1.6 Conservation Easements
ENV 2.1.7 Rural Development Initiatives
ENV 2.1.8 Use Value Assessment
ENV 2.1.9 Urban Growth Boundaries [Urban and Village Expansion Areas]
ENV 2.1.11 Educational and Informational Distribution Program
ENV 2.1.12 Conservation Easements and Virginia Scenic Byways

ENV 2.6 Open Space Corridors : Create a countywide greenway plan which would include a riverside protection plan for the New, Roanoke, and Little Rivers and their tributaries.

ENV 2.1.1 Special Service Districts
ENV 2.1.2 Community Development Authorities
ENV 2.1.3 Agricultural/Forestal Districts
ENV 2.1.4 Sliding Scale Zoning
ENV 2.1.5 Rural Cluster Zoning
ENV 2.1.6 Conservation Easements
ENV 2.1.9 Urban Growth Boundaries [Urban and Village Expansion Areas]
ENV 2.1.10 Public Land Acquisition Program
ENV 2.1.11 Educational and Informational Distribution Program
ENV 2.1.12 Conservation Easements and Virginia Scenic Byways

ENV 2.7 Land Trust Support Objective: Support, through policy and funding measures, land trusts for the New River Valley that coordinate conservation easement programs and other land conservation transactions, such as the donation and purchase of easements. Develop a program for the County to hold interest in conservation easements.

ENV 2.1.6 Conservation Easements
ENV 2.1.11 Educational and Informational Distribution Program
ENV 2.1.12 Conservation Easements and Virginia Scenic Byways

ENV 2.8 Inter-Authority Planning Cooperation: Initiate cooperation among Montgomery County, Blacksburg, Christiansburg, Radford, Virginia Tech, Radford University, as well as surrounding counties to coordinate their plans to prevent gaps in rivershed and viewshed protection projects and stretch open space protection budgets by pooling talents and resources.

ENV 2.8.1 Representative County Planning Group: Create a team of county representatives responsible for bringing county interests to the attention of the Virginia Tech, Blacksburg, Christiansburg, and Radford planning agencies.

ENV 2.8.2 Cooperative Area Plans: Create and implement action plans for those areas identified in Objective 8, Milton Herds 2002 report, as well as those

areas identified by the Representative County Planning Groups.

ENV 2.1.1-12 Approaches to Open Space and Agricultural Preservation: (18)

ENV 2.1.1 Special Service Districts: Special Service Districts (SSDs) are created by passage of an ordinance by the Board of Supervisors. They require an organized plan and dedicated board to carry out the goals, which could be tailored to open space preservation. SSDs can be used to preserve open space by allowing a designated board to purchase development rights with the money raised from special real estate taxes.

ENV 2.1.2 Community Development Authorities: Community Development Authorities (CDAs) are very similar to Special Service Districts but are allowed specifically to raise funds to purchase easements and development rights. The other key difference is that Authorities can take on long-term debt allowing them to issue revenue-generating bonds as a means of producing income.

ENV 2.1.3 Agricultural/Forestal Districts: Agricultural/Forestal Districts are rural zones that have been reserved for the production of agricultural products and timber. Established as a local planning tool in the 1970s by the General Assembly, they are established according to state guidelines with the approval of the local governing body. A district constitutes a voluntary agreement between landowners and the government that no new, non-agricultural uses will take place in the district. An agricultural/forestal district provides much stronger protection for farmers and farmland than does traditional zoning, because it assures that the Use Value Assessment will continue to be available to landowners within the district. Participation in an agricultural/forestal district can also provide protection from local nuisance ordinances. To encourage agricultural/forestal district participation and to reflect the 8-year commitment by landowners, the County should consider local tax incentives above and beyond those currently provided through the Land Use Assessment program. (19)

ENV 2.1.4 Sliding Scale Zoning: (20) Sliding Scale Zoning is a method of zoning requiring that the larger the initial size of the parent parcel prior to subdividing, the lower the permitted density. The permitted density decreases on a sliding scale as the size of the parent parcel increases. The rationale is that higher densities should be allowed on smaller tracts because they are difficult to farm and may have already moved out of agriculture and into the residential land market. Minimum lot size is usually set at 1 acre or a maximum of 2 acres and a large number of acres can be utilized for open space.

ENV 2.1.5 Rural Cluster Zoning: Rural Cluster Zoning allows a relatively significant amount of residential development to occur in rural and farming areas while at the same time ensuring that such development is designed and laid out to have the least possible impact on the landscape and to preserve large chunks of open space land even after development is complete.

ENV 2.1.6 Conservation Easements: Conservation Easements are restrictions placed on a parcel of land by its owner that limit how the land may be used in the future. Based on the owner's decision, a conservation easement may be used to prevent the future conversion of land from its present state to residential, commercial, or other uses. The placement of a conservation easement on a land parcel is totally voluntary and, in most cases, results in tax benefits for the owner. Conservation easements may be used alone or in combination with a local Purchase of Development Rights (PDR) program. (21)

ENV 2.1.7 Rural Development Initiatives: (22)

Cross References and Notes:
18. Development in the agricultural and forested areas of the County are discussed in greater detail in PLU 1.2: Resource Stewardship Areas (pg.35) and PLU 1.3: Rural Areas (pg.37).
19. Land Use Assessment is currently used in Montgomery County.

Cross References and Notes:
20. Sliding scale zoning is currently utilized in the A-1 (Agriculture) and C-1 (Conservation zoning districts).
21 " A Model Purchase of Development Rights (PDR) Program for Virginia" (April 2004) Virginia Department of Agriculture and Consumer Services and Farmland Preservation Task Force.
22. Rural development initiatives represent one part of the County's entrepreneurial economy. Additional references to small businesses is included in ECD4.1.1: Entrepreneurial Economy (pg.102).

Economic Development is normally associated with industrial and commercial enterprise efforts, but the basic approach can also be applied to the agricultural and forest industries. Such efforts can include agri-tourism and eco-tourism, development and promotion of alternative and/or local markets and the development of alternative products or production techniques. Rural Economic Development Initiatives are a part of this report because they are voluntary and address the fundamental benefit of making open space land uses more economically competitive and intensive in order to achieve long term conservation.

ENV 2.1.8 Use Value Assessment: Use Value Assessment is a popular program in Virginia that has been used by many localities since the 1970s. Use Value Assessment is a system by which property taxes are based on the current use of the land, rather than on its potential market value as developable (residential, commercial, or industrial) land. This change in tax rate often provides farmers with enough additional income to continue farming, when they otherwise would have to sell their land to pay their taxes. It is also known as Land Use Assessment.

ENV 2.1.9 Urban Growth Boundaries [Urban and Village Expansion Areas] : Urban Growth Boundary consists of invisible lines drafted by planners to signify areas beyond which future growth in the city should not pass. The boundary is often drawn outside of existing political boundaries, such as city limits. Land within the boundaries is designated as "urbanizable land."

ENV 2.1.10 Public Land Acquisition Program: Public Land Acquisition Program is a fund created by a county for the express purpose of purchasing public open space for use as parks, or recreational corridors.

ENV 2.1.11 Educational and Informational Distribution Program: To give the residents of Montgomery County access to open space preservation information from the county, state and national level, which they can use to protect their land from development. One of the fundamental problems with open space protection is that most landowners are unaware of the tools available for the protection of their land, and those that have had some exposure to these tools only have a partial understanding of how they work. This strategy is essential for the success of open space preservation, because until landowners are more familiar with the available tools, the County will continue to meet resistance from many of the County's residents. (23)

ENV 2.1.12 Conservation Easements and Virginia Scenic Byways: Virginia Byways are existing roads with significant aesthetic and cultural values, leading to or lying within an area of historical, natural or recreational significance. Virginia Byways designate corridors of regional significance. Accordingly, the County actively supports the retention of agricultural, forest, and open space uses along Virginia Byways. (24)

Cross References and Notes:
23. Overall approaches to public information is addressed in PNG 2.2: Informing the Public (pg.67).
24. Scenic Byways is also referenced in TRN 2.6 (pg.223)

ENV 3.0 Streams, Rivers, and Surface Waters: The county is committed to working to maintain and to enhance the quality of its many streams and rivers for human health, habitat vitality, and safe recreational opportunities. Furthermore, the county is committed to ensuring that the problems such as flooding, erosion, and sedimentation will be minimized. (25)

ENV 3.1 Agricultural Program and Policy: Encourage farmers and landowners to work with existing government agencies, such as Skyline Soil and Water District, and programs and to learn about and use Best Management Practices (BMP's) to protect surface water qualities.

ENV 3.1.1 Floodplain Ordinance: Enhance the floodplain ordinance to require that riparian buffers remain undisturbed at a specified distance from the edge of all streams with a designated floodplain (e.g. minimum of 100 feet). (26)

ENV 3.1.2 Water Quality Protection Ordinance: Develop a water quality protection ordinance that includes provisions to preserve the natural forested vegetation along the corridors of all perennial streams and rivers.

ENV 3.1.3 Environmental Quality Corridors: Develop an Environmental Quality Corridor (or Water Quality Corridor or Creek Overlay District like Blacksburg) that requires the preservation of riparian buffers as a foundational component.

ENV 3.1.4 Agricultural Best Management Practices: Work with farmers to locate and obtain grant funding from resources such as the Virginia Agricultural Best Management Practices Cost Share or the USDA's Environmental Quality Incentives Program. These incentives encourage the use of Best Management Practices (BMPs) including riparian buffers, fencing of livestock, and providing alternative watering sources for livestock.

Cross References and Notes:
25. Floodplains are addressed in ENV 4.0: Floodplains (pg. 143). Erosion and Sediment Control is addressed in ENV 7.0: Stormwater and Erosion Control (pg.148) and UTL 4.0 Stormwater Management (pg. 237).
26. Riparian buffer easements are addressed in ENV 7.3.3 Tax Incentives for Riparian Buffer Easements (pg.149). Riparian areas are addressed in ENV 3.2.7 Protection of Riparian Features (pg.142).

ENV 3.1.5 Environmental Education and Outreach: Develop an educational and outreach program tailored to farming practices near impaired waters to assist farmers in sharing information and learning about alternative techniques.

ENV 3.1.6 Agricultural and Forestal Districts: Strengthen the quality of the Agricultural and Forestal District (AFD) management plan review to ensure that water quality goals are an essential element on properties in the AFD. Enlist the assistance of Extension Service staff, the Skyline Soil and Water Conservation District staff, and other advisory bodies in clarifying the review process.

ENV 3.1.7 Skyline Soil and Water Conservation District: Work with the Skyline Soil and Water Conservation District to identify county needs and participate in district programs. In order to facilitate the programs of the District and to demonstrate commitment to the partnership, the County should increase funding resources (currently $4000) to the District equivalent to at least half of the amount provided by the highest paying county (currently Floyd County at $11,455) in the District.

ENV 3.1.8 Extension Service: Work with the county Extension Service to disseminate information in newsletters to farmers and to organize educational sessions on maintaining water quality while enhancing agricultural practices.

ENV 3.2 Vegetation and Soil: Develop initiatives and ordinances that maintain and enhance of the integrity of surface water bodies during development and redevelopment projects by minimizing clearing of vegetation and disturbance of soils.

ENV 3.2.1 Impervious Surface: Amend zoning ordinance to reduce the percent of coverage from buildings, parking, and other impervious surfaces.

ENV 3.2.2 Vegetation: Increase incentives for maintaining existing vegetation during development.

ENV 3.2.3 Compliance Incentives: Adjust the fee schedule to allow for a reduction in fees for quality

development proposals that comply with the purposes of this objective.

ENV 3.2.4 Maintaining Water Quality: Establish standards for water quality improvement during the development or redevelopment of properties located within Urban Expansion Areas, and other areas targeted for development and redevelopment, through replacement of improperly maintained BMPs, replacement of inefficient sanitary sewer lines or failing septic systems, and, where appropriate, revegetation along streams.

ENV 3.2.5 Commercial and Industrial Runoff: Locate away from the County's water bodies those nonresidential activities that use, store, or manufacture significant quantities of toxic substances.

ENV 3.2.6 Preservation of Natural Landscapes: Develop general design evaluation guidelines, criteria, and techniques that promote the preservation of natural landscapes and apply them in the evaluation of rezoning and/or special use permit applications.

ENV 3.2.7 Protection of Riparian Features: Where appropriate, require rezoning and special use permit applicants to describe in general detail the natural character of significant creeks, rivers, lakes, and ponds (as characterized on United States Geological Survey Maps) located on the property, as well as the 100-year floodplain. Require applicants for such rezonings and/or special use permits to explain how the significant surface water bodies and related shorelines to be retained upon completion of the project will be protected during construction.

ENV 3.2.8 Shrink/Swell Soils: Amend applicable County Ordinances to require a shrink/swell soils study for development and construction. (27)

Cross References and Notes:
27. Virginia Uniform Statewide Building Code (2000 Edition) Section R401.4 Soil Tests (effective October 1, 2003)

ENV 3.3 Individual Septic System Work to reduce septic leaching problems by encouraging proper locating, maintenance, and testing of septic tank systems.

ENV 3.4 Public Awareness: Address water resource concerns in the County by developing networking opportunities for citizen groups and school programs to share information and pool resources, and enlist their aid in the Virginia Department of Environmental Quality's stream water quality monitoring programs.

ENV 3.4.1 Grants: Assist organizations in locating and obtaining grant funding for various projects for the County's streams and rivers.

ENV 3.4.2 Technical Data/ Resources for Identifying Problem Areas: Provide technical data and resources where available to allow citizen groups to identify current and potential future problems or concerns.

ENV 3.4.3 Citizen Involvement: Enlist the aid of citizen groups in community clean up efforts such as Adopt-A-Highway, Adopt-A-Stream, Broomin' and Bloomin', Save Our Streams, etc.

ENV 3.4.4 Public Information: Activities, Meetings, and Events: Maintain a list of contact information for local citizen groups involved in water quality issues, and work with citizen groups to communicate activities, meetings, and other events to a central office so that information can be disseminated to other citizen group leaders.

EN**V 3.4.5 Citizen Water Quality Monitoring:** Identify groups that have a significant interest in surface water in the County including, but not limited to, angling groups, outdoor recreation groups and/or companies, watershed or water quality protection organizations, science and ecology classes in public schools, etc. Hold the training sessions and obtain commitments from volunteers to perform regular monitoring of streams that are of particular interest to them.

ENV 3.4.6 Save Our Streams: Work with the Virginia Natural History Museum, Fish and Wildlife Service, Virginia Tech departments, and/or DEQ officials to

continue implementation of the Save Our Streams Program, including develop training sessions and monitoring kits for interested county volunteer monitors and schools.

ENV 3.5 Government Cooperation: Work with the Towns of Blacksburg and Christiansburg, the City of Radford, and neighboring counties to ensure consistency and compatibility of goals, objectives, and strategies in the water quality planning process.

ENV 3.5.1 Regional Roundtable: Enlist the aid of the New River Valley Planning District Commission, Roanoke Valley Regional Commission, and the Roanoke River Corridor Committee to develop regional roundtables to plan for and to address water quality concerns.

ENV 4.0 Floodplains: Montgomery County seeks to maintain and enhance the integrity of its floodplains through improved public education, public safety, governmental cooperation, ordinances, and data.

ENV 4.1 Partnership and Regional Cooperation: Continue to build partnerships with public agencies to preserve and enhance floodplains in the County.

ENV 4.1.1 Regional Cooperation: New River Valley: Enhance collaboration with the New River Valley Planning District Commission through regular participation in regional meetings.

ENV 4.1.2 Regional Cooperation: Roanoke & James River Watersheds: Develop working relationship with local governments in the Roanoke Valley to preserve and protect floodplains within the headwaters of the Roanoke and James Rivers.

ENV 4.1.3 Public Education: Work to educate property owners, builders, lenders, and others of the negative effects of building within the floodplain. Education programs should be developed in collaboration with the relevant agencies listed above.

ENV 4.2 Floodplain Program and Policy: Develop programs/policies/ordinances that will encourage developers and builders to avoid developing within or directly adjacent to the floodplain.

ENV 4.2.1 Flood Damage Prevention Overlay District: Enhance the Flood Damage Prevention Overlay District of the zoning ordinance to require that riparian buffers remain undisturbed at a specified distance from the edge of all streams within a designated floodplain (e.g., minimum of 100 feet) as well as to encourage greater buffers through incentives such as tax relief or land use valuation.

ENV 4.2.2 Code Enforcement: Continue to enforce applicable county, state and federal regulations within the designated 100-year floodplain.

ENV 4.3 Public Safety: Reduce and/or eliminate the long-term risks to human life and property from flooding and its effects through the use of timely data. (28)

ENV 4.3.1 Regional & Local Hazard Mitigation Plan: Continue to work with the New River Valley Planning District Commission to develop a local hazard mitigation plan.

ENV 4.3.2 Flood Mitigation Measures: Following completion of the local hazard mitigation plan (which may include prioritized areas), apply for Flood Mitigation Assistance Program funds (dependent on successful completion of strategy 2) to acquire or relocate structures from floodplain areas and to construct certain types of minor and localized flood control projects. Hazard Mitigation Grant Program funds may be sought following a hazard declaration and assistance may be sought through the New River Valley Planning District Commission.

Cross References and Notes.
28 Hazard Mitigation and the New River Valley Hazard Mitigation Plan are also addressed in SFY 1.1.4: NRV Hazard Mitigation Plan (pg. 197) and UTL 4.2: Regional Hazard Mitigation Plan (pg. 237). A copy of the NRV Hazard Mitigation Plan is available from the New River Valley Planning District Commission.

ENV 5.0 Groundwater: Montgomery County is committed to maintaining an abundant and clean supply of subsurface water resources.

ENV 5.1 Septic System and Well Water Testing: Work with the New River Valley (NRV) Health Department to develop a process for locating and testing well water quality and septic systems on a regular basis to ensure that groundwater quality is consistently monitored and that contamination risks are minimized. (29)

ENV 5.1.1 Tracking Septic System Maintenance: Develop an official process in conjunction with the NRV Health Department and certified private septic system maintenance firms to track septic system maintenance throughout the County. The process could include the following components but may include others deemed appropriate by the partnership participants: Private firms should report the name, address, date of pumping, overall quality of the septic system, and other information deemed necessary by the participating parties. The Health Department should maintain the records provided by the private firms in the upcoming statewide database system for ease of reference and use. Once the database is established, the health department with other agencies can identify septic systems that have not been pumped and send reminders to landowners (much like the private firms do now for past customers).

ENV 5.1.2 Septic System/ Well Testing with Real Estate Transactions: Implement a county process with the NRV Health Department, which would require that well testing and/or septic system testing reports accompany every real estate transaction involving septic systems or well water resources.

ENV 5.1.3 Monitoring of Alterative Onsite Wastewater Treatment Systems: Assist the NRV Health Department in identifying engineering firms that install, monitor, and maintain alternative onsite wastewater treatment systems in the County. Work with the engineering firms to participate in the septic system

Cross References and Notes
29. Issues surrounding septic systems are also addressed in UTL 1.4: Individual Systems (pg. 235).

maintenance partnership to share information about the location and condition of the alternative systems. Since these systems are regularly monitored, the necessary information should be readily available.

ENV 5.2 Education: Educate landowners on various factors to consider in choosing and maintaining onsite wastewater treatment systems, and encourage connections to public sewer systems where possible.

ENV 5.2.1 Septic System Maintenance: Identify septic tank owners who have not regularly maintained their septic systems through the process outlined in objective one. Beyond sending postcard reminders, disseminate educational pamphlets and booklets developed by the Virginia Water Resources Center to educate reluctant septic tank owners of the benefits of regular maintenance procedures.

ENV 5.2.2 Alternative Wastewater Processing Systems: Work with the NRV Health Department to promote alternative wastewater processing systems that treat effluent before discharging the waste into surrounding soils. These systems are particularly suited to Montgomery County given the incompatibility of county soils with traditional systems. These systems should be promoted in new developments and especially for homes that have experienced a septic system failure.

ENV 5.3 Groundwater Quality Protection Programs and Policies: Develop and/or update ordinances, policies, and programs that ensure responsible land use in karst terrain for the protection of groundwater quality.

ENV 5.3.1 Septic System Maintenance: Update the process for applying for Building Permits to require that a proof of septic system maintenance accompany the application.

ENV 5.3.2 Drainfield Requirements: Review the zoning ordinance to ensure that lots in areas that require septic tank waste disposal systems are large enough to accommodate two drain fields one of which can be used for repair drainage fields when the first field fails.

ENV 5.3.3 Connection to Public Sewer: In cases where public sewer is available, require hook-ups to the system for new units, even where the zoning ordinance would otherwise allow septic systems. Where existing septic systems fail and sewer systems are accessible, require hook-ups to the system instead of a septic system repair job.

ENV 5.4 Wellhead Protection: Complete all twelve steps for the wellhead protection process as identified by the Virginia Groundwater Protection Steering Committee within 5 years of the adoption of this plan.

ENV 5.4.1 Well-Head Protection Program: Implement a Well-Head Protection Program, including: 1) Establish a Wellhead Protection Advisory Committee and appoint a project leader; 2) Determine the appropriate areas to include in wellhead protection areas, based on the 1993 Wellhead Protection Program report for Montgomery County; and 3) Identify management strategies to mitigate the impact of land uses within the protection area on the water source. (Consult Montgomery County's 1993 Proposed Wellhead Protection Program and the Virginia Ground Water Protection Steering Committee's 1998 Implementing Wellhead Protection publication.)

ENV 5.4.2 Public Involvement: Encourage public involvement in the development and implementation of the wellhead protection program by including interested citizens on the advisory committee and holding public information and comment sessions in communities that might benefit from a wellhead protection program.

ENV 5.5 Conservation: Encourage landowners to conserve water and consider the impacts of their water use on others in their region.

ENV 5.5.1 Public Information: Develop and disseminate educational materials to the public on water conservation measures for both private and business uses.

ENV 5.5.2 Best Management Practices. Strategy: Work with local farmers to identify best management practices for crop watering during drought years. Enlist

the aid of area universities, the Farm Bureau, and other interested parties in developing educational materials and disseminating the information.

ENV 5.5.3 Wastewater/water Recycling and Reclamation Programs: Investigate water recycling/reclamation practices and advocate such practices where applicable in the County.

ENV 5.6 Development: Minimize the coverage of impervious surfaces to allow rain percolation through strategies such as low-impact development and stormwater management planning and concentrate new development in areas where public water supplies and sewer systems exist or are planned.

ENV 5.6.1 Groundwater Identification: Identify areas of the County where groundwater resources are abundant and encourage rural development and redevelopment in proximity of these water resources. Consider these areas for designation as expansion areas and/or urban growth areas.

ENV 5.6.2 Adequate Facilities Policy: Develop an adequate facilities policy for the County modeled after the Route 177 Corridor Overlay District to ensure adequate levels of service for public water supplies.

ENV 5.6.3 Cooperative Urban/Suburban Planning: Coordinate planning efforts with the towns of Blacksburg and Christiansburg and the City of Radford to encourage infill development in and around the towns and city.

ENV 5.7 Monitoring: Implement a monitoring program for well systems in areas that may be affected by mine drainage (notably, near Brush Mountain and Price Mountain) or other areas that are at a particular risk of contamination to ensure public health and safety.

ENV 5.7.1 Water Quality: Work with the NRV Department of Health, area universities, citizen groups or other appropriate resources on developing a regular monitoring schedule to keep track of water quality concerns in wells near closed mines.

ENV 5.7.2 Well Testing: If contaminated well systems are identified due to monitoring efforts in the County, work with the NRV Department of Health, area universities, and/or citizen groups or other appropriate resources to test wells in the surrounding area to ensure that other nearby wells are checked for health risks.

ENV 6.0 Karst Goal: Montgomery County is committed to managing karst terrain in such a manner so as to: 1) protect groundwater and surface water resources from contamination; 2) reduce potential for property damage resulting from subsidence, or other earth movement, and sinkhole flooding; 3) protect the health, safety, and welfare of the public; and 4) protect the habitat of rare, threatened, and endangered animal species and ecosystems that depend on the environmental quality of Montgomery County's karst terrain.

ENV 6.1 Planning: Identify and map bedrock geology, karst terrain, and sensitive karst terrain at a scale appropriate for environmental planning. Incorporate these maps into the planning tools used by the county.

ENV 6.2 Program and Policy: Adopt policies and procedures that preserve, protect, and restore significant karst features in Montgomery County.

ENV 6.2.1 Karst Ordinance: Adopt a Karst or Carbonate Area Ordinance that includes:

a. Programs, policies, and/or amendments to established ordinances that will preserve and restore Karst Feature Buffers around karst terrain recharge features (e.g., sinkholes, caves, sinking creeks).

b. Programs, policies, and/or amendments to established ordinances that will establish substantial (one thousand [1000] feet) minimum distances from which underground storage tanks and hazardous waste must be kept from karst terrain recharge features (e.g., sinkholes, caves, sinking creeks).

c. Programs, policies, and/or amendments to established ordinances that prohibit trash dumps in karst terrain recharge features, especially, but not limited to sinkholes.

d. Programs, policies, and/or amendments to established ordinances that substantially increase the minimum septic system standards set by the New River Valley Department of Health to ensure greater groundwater protection in karst areas.

ENV 6.3 Public Awareness: Promote public awareness of karst related issues by providing public information on karst geology and water quality.

ENV 6.4 Conservation: Encourage and facilitate the application of permanent open space land conservation tools to protect areas of the County identified as sensitive karst. Potential open space tools include, but are not limited to, agricultural-forestal districts conservation easements, large lot zoning, sliding scale zoning, rural cluster zoning, public land acquisition, and the purchase of development rights. Each of these tools is detailed in the open space section of this plan.

ENV 6.5 Stormwater Management: Maintain the pre-development drainage patterns (including the quantity and timing) of runoff draining into karst terrain features.

ENV 6.5.1 Karst Feature Overlay Districts: Amend the Montgomery County Subdivision and Zoning ordinances to include a Karst Feature Overlay District (or Limestone Overlay District). Development within this district should maintain pre-development drainage patterns on the site and the quantity and quality of stormwater runoff entering karst terrain features on, and adjacent to, the site. In addition, the construction of any structure in an area determined by a Geophysical Study to be susceptible to subsidence that would be harmful to the public safety or the safety of future residents should be prohibited if the potential harm cannot be mitigated.

ENV 6.5.2 Low Impact Development: Amend the Montgomery County Subdivision and Zoning ordinances to allow and strongly encourage the use of Low Impact Development (LID) techniques. It will be necessary to carefully screen the LID tools to ensure that those techniques used in Montgomery County are appropriate for use in karst terrain (please refer to the Karst-LID Workgroup study being conducted by the Northern Shenandoah Planning District Commission, contact details in Appendix II).

ENV 6.5.3 Erosion and Sediment Control: Amend the County Erosion and Sediment Control ordinance to protect karst recharge features and encourage land developers to implement additional Best Management

Practices (BMPs) to limit the clogging of karst recharge features by sediment.

ENV 6.6 Conservation Best Management Practices: Encourage the use of both agricultural and silvicultural BMPs and cost share programs in karst areas, especially the Conservation Reserve Enhancement Program.

ENV 6.6.1 Karst and Ground Water Best Management Practices: Work with the Skyline Soil and Water Conservation District, the Natural Resources Conservation Service, the Farm Service Agency and the Virginia Department of Forestry to help improve voluntary implementation of karst and groundwater protection BMPs.

ENV 6.6.2 Conservation Reserve Enhancement Program: Strongly encourage landowner participation in the Conservation Reserve Enhancement Program and work with the sponsoring agencies to achieve as a high a participation rate as possible.

ENV 6.7 Governmental Cooperation: Work with the towns of Blacksburg and Christiansburg, the City of Radford, and the neighboring counties to provide a regional approach to land use management decision-making in karst terrains and karst impacted groundwater and surface water resources.

ENV 6.7.1 Regional Karst, Groundwater, and Surface Water Roundtables: Enlist the aid of the NRV Planning District Commission and Roanoke Valley-Alleghany Regional Commission to develop regional roundtables to plan for and address karst terrain and related groundwater and surface water issues.

ENV 6.8 Water Quality: Gauge and establish baseline water quality data at all major springs.

ENV 6.8.1 Hydrological Studies: Perform hydro studies (dye trace) to delineate recharge areas for major (>0.5 MGD) springs and water supply wells serving > 10 residences or industries.

ENV 7.0 Stormwater & Erosion Control: County is committed to managing stormwater and erosion in order to protect surface water quality and aquatic habitat vitality, to guard against the loss of landmass and to maintain and enhance human health and safety. (30)

ENV 7.1 Stormwater and Erosion Management Program. Develop a proactive stormwater management program designed to address stormwater runoff in watersheds and villages.

ENV 7.1.1 Village Planning and Stormwater Management. Work with the County Engineer to develop a stormwater management plans in tandem with each of the six village plans (Belview, Elliston-Lafayette, Plum Creek, Prices Fork, Riner, and Shawsville).

ENV 7.1.2 Comprehensive Watershed Management Study. Conduct a local comprehensive watershed management study for Montgomery County and revise ordinances to address results.

ENV 7.1.3 Stormwater Management Database. Create a database of projects, integrated with the County's GIS, that would track projects and activities, including timber operations, which contribute to runoff and erosion.

ENV 7.1.4 Stormwater Management Ordinance. Develop, adopt, and implement a stormwater management ordinance, in line with Phase II of the Virginia Pollutant Discharge Elimination Program (VPDES), including 1) provisions for water quality assessment in site designs and reviews; 2) provisions for strengthening current stormwater management and erosion control requirements; and 3) and provisions which reflect new Virginia Storm Water Pollution Prevention Plan Requirements (SWPPP) which went into effect July 1, 2004.

Cross References and Notes:
30. Stormwater Management is also addressed in UTL 4.0: Stormwater Management (pg. 237). Stormwater management plans for Villages are addressed in PLU1.7.5e Stormwater Management Plans (pg.45).

ENV 7.1.5 Stormwater and Erosion Best Management Practices. Develop a Best Management Practices approach to water management for development and redevelopment, including the use of Low Impact Development (LID) techniques (clustering, limiting impervious surfaces, use of innovative pavement, etc.).

ENV 7.1.6 Public Awareness and Education. Develop an erosion/ stormwater management public awareness program.

ENV 7.2 Stormwater Authority. Examine the feasibility of developing of a joint Stormwater Utility (Stormwater Authority), including fee structure, for Montgomery County, Blacksburg, Christiansburg, and Radford.

ENV 7.3. Compliance. Investigate alternative means of encouraging compliance with erosion and sedimentation control.

ENV 7.3.1 Enhanced Inspections. Utilize building inspectors to enhance compliance with the Erosion and Sedimentation Ordinance. Additional building inspector man-hours required for erosion and sediment control inspection may be funded through a stormwater utility fee.

ENV 7.3.2 Pre-Construction Notices. Implement an on-site erosion control pre-construction notice to encourage public enforcement of the Erosion and Sedimentation Ordinance. This notice is intended to help ensure that erosion and sediment control measures are properly installed, by including a list of permit conditions and plan requirements prior to construction. Additionally, the public will be put on notice that such construction has been permitted while construction sites without such a notice have not.

ENV 7.3.3 Tax Incentives for Riparian Buffer Easements. Provide a tax exemption for land designated as a riparian buffer, if held under a perpetual easement. Riparian buffers protect streams and shorelines from erosion and prevent sedimentation of waterways. Such an exemption is provided for under Article 5, Chapter 36 of Title 58.1 of the Code of Virginia.